

Data Validation Report
2069 NORTH BRANCH
(Division Street Former MGP Site
and Willow Street / Hawthorne Avenue Station OU)

Sediment Sample Analyses Performed by

Pace Analytical, Green Bay
Pace Analytical, Minneapolis
and
TestAmerica, Burlington

Prepared for



Prepared by

SHEPHERD TECHNICAL SERVICES

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1.0 INTRODUCTION

All data validation was performed by Shepherd Technical Services following US EPA National Functional Guidelines (NFG), where applicable, using electronic deliverables.

Pace Analytical Services, Inc., Green Bay, WI performed the sample analyses on the sediment samples except for alkylated polycyclic aromatic hydrocarbons (PAHs), Total Organic Carbon, and Black Carbon. The Pace Green Bay laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200050). The Pace laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Florida Department of Health Laboratory Accreditation Program (ID #E87948).

Pace Analytical Services, Inc., Minneapolis performed the analyses for alkylated polycyclic aromatic hydrocarbons (PAHs). The Pace Minneapolis laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200011). The Pace Minneapolis laboratory also holds primary accreditation under the National Environmental Laboratory Accreditation Program (NELAP) by the Minnesota Department of Health Laboratory Accreditation Program (ID # 027-053-137).

Sample analyses for Total Organic Carbon, and Black Carbon on the sediment samples were performed by TestAmerica, Burlington, VT. The TestAmerica laboratory maintains accreditation under the New Jersey Department of Environmental Protection Environmental Laboratory Accreditation Program (NJDEP ELAP #VT972).

The laboratories provided all analytical data, including all internal laboratory QC results in an electronic deliverable format.

A total of 335 total sediment samples and 21 aqueous samples (trip blanks, field blanks, equipment blanks, etc.) were collected January to March, 2012 at the Division Street Station and Willow Street/Hawthorne Avenue Station sites. Upon collection, all samples were held securely prior to shipping overnight to the laboratory. Samples were organized into 24 sample delivery groups (SDGs, or laboratory lot numbers) performed by Pace and 20 SDGs by TestAmerica. Samples were analyzed for the indicated parameters using the methods listed in Table 2-1 and Table 3-1.

Due to the number of samples collected and analyzed for this program and the large amount of data generated, tables compiling quality control data and other information have been produced in a separate “report tables” document that is referenced throughout this document.

A number of field quality control samples were either lost or compromised as a result of a traffic accident involving the vehicle transporting the samples to the laboratory. Samples that were lost include:

- Day#2 – phenols portion of field blank lost

- Day#3 – cyanide portion of rinsate (equipment) blank lost
- Day#4 – phenols portion of rinsate (equipment) blank lost
- Day#5 – PVOC portion of rinsate (equipment) blank lost

Impacts of these QC sample losses to the associated sample data are addressed in the relevant sections below.

2.0 INORGANIC DATA REVIEW

2.1 Summary

Blank, spiked, and duplicate results were provided. Overall, QC data indicated acceptable precision and accuracy. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of sediment samples.

2.2 Sample Receipt and Methodology

The sediment samples were analyzed for inorganic parameters following the methods cited in the table below.

Table 2-1. Inorganic Analytes and Methods Summary

Analytical Method	Analyte
EPA 335.4	Total Cyanide
EPA 6020	Metals
EPA 7470/7471	Mercury
EPA 9012	Total Cyanide
ASTM D2974-87	Percent Moisture
Lloyd Kahn BC	Black Carbon
Lloyd Kahn Mod	Total Organic Carbon

Generally, the samples arrived at the laboratories properly preserved and in good condition. However, a small number of samples arrived at the TestAmerica laboratory with damaged containers. The laboratory duly noted these conditions and in each case documented the fact the damage did not impact the integrity of the sample(s) for testing purposes. Additionally, one set of samples arrived at the TestAmerica facility above the 6 °C temperature limit for thermal preservation (temperature recorded at receipt = 6.8 °C). In such cases, the NFG call for use of professional judgment in determining whether and how to qualify data. Since these samples were being analyzed for total organic carbon and black carbon only, and the magnitude of the excursion is small (<1 °C), in the reviewer’s judgment there is little impact upon the resulting data; therefore, no data are qualified as a consequence of the apparent temperature excursion.

Some of the samples were held in the field for one or two days prior to delivery to the laboratory. All samples were analyzed within the prescribed holding times where holding times have been defined.

While the Sampling and Analysis Plans (SAPs) for this project define EPA SW-846 Method 9012A for Total Cyanide analyses for both sediment samples as well as aqueous blank samples (field blanks, etc.), Table 2-1 lists EPA Method 335.4 one of the methods used for Total Cyanide determinations. This reflects an error on the part of the laboratory which defaulted to the wastewater method (Method 335.4) for the analysis of non-potable water samples. While the two different methods were developed for two different regulatory programs, they are technically comparable, are based on identical chemistry, and should yield identical results.

2.3 Calibration

Initial instrument calibrations for each of the methods were all within acceptance criteria.

All of the calibration verification checks (CCVs) performed for these analyses met the $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the calibration data.

2.4 Blanks

The initial and continuing calibration blanks (ICBs/CBBs) for ICP/MS metals on some occasions gave values slightly above the limit of detection but below the reporting limit (limit of quantitation) for some of these elements. All of the elements except zinc gave positive values for one or more of the calibration blanks. Further, all of the calibration blank values are well below the reporting limit, and orders of magnitude below any of the values found in the samples. Consequently no data will be qualified due to calibration blanks.

The initial and continuing calibration blanks (ICBs/CBBs) for mercury all gave results below the limit of detection. Therefore no data are qualified as a consequence of the calibration blank data.

The initial and continuing calibration blanks (ICBs/CBBs) for cyanide all gave results below the limit of detection. Therefore no data are qualified as a consequence of the calibration blank data.

The initial and continuing calibration blanks (ICBs/CBBs) for Total Organic Carbon and Black Carbon in some cases gave results between the limit of detection and the reporting limit. However, in all cases the measured values in the blanks were at least two orders of magnitude lower than measured values in the samples. Therefore no data are qualified as a consequence of the calibration blank data.

Method blanks were prepared for each batch of samples prepared for analysis for each method.

One of the method blanks for metals gave a result for copper slightly above the reporting limit. However, since all of the values for copper in the associated samples are $\gg 10x$ the method blank concentration, no action is taken to qualify any of the data.

Two of the method blanks for mercury in the sediments samples and one of the method blanks for mercury in the aqueous samples gave a positive value between the limit of detection and the

reporting limit. However, none of the samples gave any positive results below the reporting limit, hence no data are qualified as a consequence of the mercury blanks.

None of the method blanks for total cyanide showed any contamination above the detection limit.

Several of the method blanks for total organic carbon and black carbon gave a positive value between the limit of detection and the reporting limit. However all of the sample results were at least two orders of magnitude greater than the method blank values, therefore no sample data are qualified due to blank contamination.

As a result of a traffic accident involving the vehicle transporting the samples to the laboratory cyanide portion of the rinsate (equipment) blank for samples collected on Day#3 was lost. A reasonable worst case scenario for trying define a proxy for this lost blank would be to assume the same level of contamination as observed in the most contaminated field blank of the surviving blanks. However, none of the fifteen surviving blanks showed any contamination for cyanide. Therefore, it is not unreasonable to assume the lost blank would have been “clean” as well. No data are qualified due to this lost field QC sample.

The method blank results are summarized in Tables 2-2 through 2-7 in the Report Tables document.

2.5 Laboratory Control Samples

Laboratory control samples (LCS) were analyzed with each of the data sets.

Laboratory control samples were prepared using commercially available reference materials or in the case of black carbon analyses, an aliquot of a NIST Standard Reference Material (SRM).

The recovery limits used by the laboratory for LCS results are either those given in the method guidance or are based upon laboratory performance. All recoveries for all analytes for all tests were within the specified limits.

Recoveries are given along with the acceptance limits in Tables 2-8 through 2-12 in the Report Tables document.

2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were evaluated for each of the parameters at appropriate frequencies. For total organic carbon and black carbon analyses, a single matrix spiked sample and sample duplicate were analyzed.

A significant number of the recoveries for mercury fell outside of the limits required by the analytical method. However, all but four of the failed recoveries are assignable to a low spike concentration relative to the amount present in the parent sample (i.e., sample amount exceeded 4x the spike concentration). Such circumstances do not merit qualification of the data. Where

failed recoveries are not assignable to low spike concentration relative to amount present in the samples, results for the spiked sample will be qualified as estimated (“J”).

All but three of the nineteen samples spiked for cyanide gave recoveries outside of the limits required by the analytical method. In addition, none of the failed recoveries are assignable to a low spike concentration relative to the amount present in the parent sample (i.e., sample amount exceeded 4x the spike concentration). Therefore results for the spiked samples with failed recoveries will be qualified as estimated (“J”).

Sample 012712246, spiked for total organic carbon (TOC), gave a high recovery in the matrix spike analysis (216% recovery). Results for the laboratory control sample were within limits suggesting matrix interferences. Consequently the TOC result for sample 012712246 will be qualified as estimated (“J”).

Matrix spike/matrix spike duplicate analyses for ICP/MS metals were performed for twenty of the samples in this data set. The MS and MSD recoveries for several of the elements failed to fall within the acceptance limits specified in the method for several samples. In most cases, the failures were assignable to a low spike concentration relative to the amount present in the parent sample (i.e., sample amount exceeded 4x the spike concentration). Subsequent post-digestion spikes all gave recoveries within limits. Such circumstances do not merit qualification of the data. Where failed recoveries are not assignable to low spike concentration relative to amount present in the samples, results for the spiked sample will be qualified as estimated (“J”).

The MS/MSD data are given in Tables 2-13 through 2-16 of the Report Tables document (note: results for total organic carbon and black carbon are not included). Values outside of recovery or RPD limits are shown in ***bold italic shaded font***.

2.7 ICP/MS Serial Dilutions

All serial dilution tests met the acceptance criterion defined in the test method for all of the metals. Consequently no results are qualified due to serial dilution failures.

2.8 Field Duplicates

Field duplicates were collected and analyzed for all of the inorganic parameters. Field duplicates generally show excellent agreement for all of the analytes where the values are above the sample quantitation limit. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate “NDs”, however, are reported with 0% RPDs.

Criteria for evaluating field duplicate precision is provided in the Multi-Site QAPP Addendum dated March 12, 2012. Worksheet #28 of that addendum defines and upper limit of 30% RPD for precision between field duplicate values for inorganic parameters.

For the ICP/MS field duplicates, nineteen individual results (including all elements except aluminum, iron, and manganese) exceeded 30% RPD. Based upon the RPD values for these

elements, sample results for those elements for those duplicate samples will be qualified as estimated (“J” or “UJ”).

Five of the cyanide field duplicates gave RPD values exceeding the 30% RPD limit specified in the QAPP Addendum. Similarly, all sample results for cyanide will be qualified as estimated (“J” or “UJ”).

Five of the field duplicates for mercury gave an RPD value greater than 30% RPD. Similarly, all sample results for mercury will be qualified as estimated (“J” or “UJ”).

Field duplicates for total organic carbon, black carbon, and moisture all gave RPD values below the 30% limit. No samples data for these three tests are qualified based upon field duplicate precision.

The results of the duplicate analyses are given in Tables 2-17 through 2-18 found in the Report Tables document.

3.0 ORGANIC DATA REVIEW

Blank, spiked, and duplicate results were provided. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples. Ottawa sand was used as the matrix for VOC method blank analysis. Sodium sulfate was used as the matrix for method blanks for the semivolatile organics (PAHs, PCBs, Phenols, SVOCs, and Alkylated PAHs) analyses.

Sediment samples were analyzed for organic compounds following SW-846 Methods or laboratory developed methods as shown in Table 3-1.

Table 3-1. Organic Analytes and Methods Summary

Analytical Method	Analyte
Alkylated PAH by SIM	Alkylated PAHs
EPA 8082	PCBs
EPA 8260	Purgeable Volatile Organic Compounds (PVOC)
EPA 8270	Semivolatile Organic Compounds (SVOC)
EPA 8270 by SIM	Polycyclic Aromatic Hydrocarbons (PAH)

Generally, all samples were received by the laboratory in good condition and intact. Therefore, no data are qualified based upon sample receipt conditions. However, a number of field quality control samples were either lost or compromised as a result of a traffic accident involving the vehicle transporting the samples to the laboratory. Samples that were lost include:

- Day#2 – Phenols portion of field blank lost
- Day#4 – Phenols portion of rinsate (equipment) blank lost

- Day#5 – PVOC portion of rinsate (equipment) blank lost

For those samples collected on the days for which the blanks were lost, a worst case scenario and one most protective of the environment, would be to assume that all positive values observed in the samples are attributable to a native presence of the compound in the sample and are not an artifact of either the sampling or sample transport processes. No data are qualified based upon the absence of results for these missing blanks.

The laboratory documented receipt of one of the sample vials for VOC analyses for sample 020112466 as received with an “unseated septa”. The laboratory made no indication of any sample leakage. Laboratory records do indicate the septum was replaced in the lab after consultation with the project team. Since the sample in question was a methanolic extract, the brief exposure to the atmosphere during the process of replacing the septum should have minimal impact upon the sample analysis. However, the associated sample results should be viewed as minimum values and are therefore qualified as estimated (“J”).

3.1 SW-846 Method 8260B – Purgeable Volatile Organic Compounds

3.1.1 Summary

SW-846 Method 8260B employs gas chromatographic separation with a mass spectrometer as a detector.

3.1.2 Method Blanks

The sediment samples were analyzed in eighteen analytical batches. The aqueous samples (trip blanks) were analyzed in eight analytical batches. None of the method blanks associated with these analytical batches showed any detectable contamination. Therefore, no data are qualified as a consequence of the method blank data.

The method blank data are summarized in Table 3-2 found in the Report Tables document.

3.1.2 Trip Blanks, Field Blanks, Equipment Blanks

Five trip blanks were provided with this sample set. None of the trip blanks associated with these samples gave results above the detection limit.

Fifteen equipment blanks were also collected and submitted for analysis. None of the equipment blanks associated with these samples gave results above the detection limit.

One field blank was submitted with this sample set. None of the compounds of interest were detected in the field blank associated with these samples.

No data are qualified as a consequence of any of the field quality control blanks.

3.1.4 Calibration

All initial calibration criteria were met for all compounds. All analytes fit first order linear regression curves and gave average response factors (RFs) with <15% RSD over the average. Therefore average RFs were used in sample quantitation. No data are qualified as a result of the initial calibration data.

For evaluating calibration verifications, the June 2008 CLP National Functional Guidelines have established a $\pm 40\%$ drift or difference acceptability criterion for analytes known to exhibit poor response and a $\pm 25\%$ drift or difference criterion for all other target analytes. None of the analytes of concern in this investigation are considered to exhibit poor response. The calibration verification associated with this data set did not exceed the $\pm 25\%$ difference criterion in place for all other target analytes. Consequently, no data are qualified as a result of the calibration verification data.

3.1.5 Surrogate Compound Recoveries

Three surrogate compounds, 4-bromofluorobenzene, toluene- d_8 , and dibromofluoromethane were spiked into each field sample to monitor analyte recovery in the analytical system. The surrogates used by the laboratory are acceptable to measure recovery under EPA SW-846 guidance for this analytical method.

In some cases surrogate compound recoveries are reported with a 0% recovery a due to sample dilution due to high analyte concentrations or high amounts of non-target analytes present in the samples. In these cases, the laboratory appended their "S4" or "D3" qualifier to indicate dilution as the cause for the low recovery. Sample dilution, when warranted, is not cause to further qualify sample results.

Three samples, 012412017, 012512137, and 012512121, gave recoveries for toluene- d_8 below the lower limits used by the laboratory which were confirmed by means of re-analysis of the sample. Recoveries for toluene- d_8 in these three cases are assigned to matrix interferences and are reported by the laboratory with their "S2" qualifier to alert the user to the apparent matrix effect. The toluene values in these three samples will be further qualified as estimated with a potential low bias ("J-").

No other data are qualified based upon surrogate compound recoveries.

Recoveries for all surrogates for all samples are presented in Table 3-3 of the Report Tables document.

3.1.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed for several samples as specified by the project team in accordance with the Sampling and Analysis Plan.

Several of the target compounds recovered outside of the limits established by the laboratory for several of the MS/MSD pairs.

No action is defined for flagging data based on the MS/MSD results or RPD values alone. However, due to the low recovery for all target analytes observed in samples 012412031 and 020212511, results for those two parent samples will be qualified as estimated with a potential low bias (“J-“).

The MS/MSD results are summarized in Table 3-5 of the Report Tables document.

3.1.7 Laboratory Control Samples

A Laboratory Control Sample (LCS) analysis was performed for each batch of sample analyzed.

None of the target compounds recovered outside of the limits established by the laboratory for any the LCS analyses for this method. Therefore no data re qualified as a consequence of the LCS recoveries.

The LCS results are summarized in Table 3-4 of the Report Tables document.

3.1.8 Field Duplicates

Field duplicates generally good agreement for all of analytes with most RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate “NDs”, however, are reported with 0% RPDs.

Six of the field duplicate pairs gave RPD values for at least one analyte greater than the 30% RPD limit published in the Multi-Site QAPP Addendum. One of the values exceeding the 30% limit was for sample 013012258 and its duplicate where both results were below the reporting limit. In this instance, qualifying the data based upon two values below the reporting limit is not necessary even though the Multi-Site QAPP Addendum does not explicitly make that distinction. Results for analytes exceeding the 30% criteria for the remaining five duplicate pairs for will be qualified as estimated (“J”) for the duplicate samples only.

The results of the field duplicate analyses are given in Table 3-6 of the Report Tables document.

3.2 SW-846 Method 8270C–Phenols

3.2.1 Summary

SW-846 Method 8270C employs gas chromatographic separation with mass spectroscopic identification for the phenolic compounds of interest.

3.2.2 Method Blanks

The samples were prepared in several different preparation batches. None of the method blanks associated with these sample analyses showed any contamination for any of the target compounds above the detection limit. Hence, no data are qualified due to the blank contamination.

The results for the two method blanks are summarized in Table 3-7 in the Report Tables document.

3.2.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. All reported DFTPP tunes passed the established criteria. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all target analyte results.

All of the initial calibration verification (ICV) and continuing calibration verification (CCV) checks for Method 8270C performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes.

No data are qualified as a consequence of the calibration data.

3.2.4 Surrogate Compound Recoveries

Six surrogate compounds were spiked into each of the samples. The laboratory report narratives and data reports documented a number of instances where terphenyl-*d*₁₄, 2-fluorobiphenyl, or nitrobenzene-*d*₅ were recovered outside of the laboratory limits. However, since the compounds of interest for the current investigation are selected phenolic compounds, only the acid surrogates are considered as part of the validation process. Hence only values for 2,4,6-tribromophenol, phenol-*d*₅, and 2-fluorophenol are considered here.

Three samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. However, in all three cases the poor recovery is a result of sample dilution necessitated by either high target analyte concentrations (the "S4" laboratory qualifier) or high non-target analyte concentrations (the "S3" laboratory qualifier). These circumstances are not cause to qualify sample data. No data are qualified as a result of surrogate recoveries data.

The surrogate recoveries for all samples are presented in Table 3-8 of the Report Tables document.

3.2.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on sixteen samples.

All of the target analytes for all of the MS/MSD analyses samples recovered within the limits used by the laboratory. Further, all of the calculated RPD values were within acceptance limits.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. Based upon the acceptable recoveries and good agreement for the field duplicates (see below), there is no need to qualify data based upon the MS/MSD recoveries.

The matrix spike/matrix spike duplicate results are summarized in Table 3-10 of the Report Tables document.

3.2.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. All of the target analytes for all of the laboratory control samples recovered within the limits used by the laboratory. Based upon the acceptable recoveries, there is no need to qualify data based upon the LCS recovery results.

The laboratory control sample results are given in Table 3-9 of the Report Tables document.

3.2.7 Field Duplicates

Field duplicates generally show excellent agreement for all of the analytes. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate “NDs”, however, are reported with 0% RPDs.

Several of the field duplicate pairs gave RPD values for at least one analyte greater than the 30% RPD limit published in the Multi-Site QAPP Addendum. However, all of the values exceeding the 30% limit were instances where both results were below the reporting limit. In these instances, qualifying the data based upon two values below the reporting limit is not necessary even though the Multi-Site QAPP Addendum does not explicitly make that distinction.

Based upon these observations, no results for any field samples associated with these duplicate pairs are qualified based upon field duplicate data.

The results of the field duplicate analyses are given in Table 3-11 of the Report Tables document.

3.3 SW-846 Method 8270C/SIM –PAHs

3.3.1 Summary

SW-846 Method 8270C/SIM employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM).

The laboratory ran into difficulty with holding times for three samples analyzed for PAHs. Sediment samples 020312613 and 021312966 were originally extracted within the prescribed holding time for extractions but failed surrogate recoveries. The re-extraction of the samples was

performed five and three days, respectively, beyond the 14-day holding time for sediments. Sample 012312016 was extracted one day beyond the 7-day holding time for aqueous samples.

All results for each of these three samples will be qualified as estimated (“J” or “UJ”).

3.3.2 Method Blanks, Equipment Blanks, Field Blanks

The samples were prepared in numerous different preparation batches. Phenanthrene, chrysene, naphthalene, and 2-methylnaphthalene were detected in one or more of the method blanks associated with these sample analyses. In all cases, the measured values were above the detection limit but below the reporting limit. Therefore, any positive values between the detection limit and the reporting limit for these analytes for samples in the associated preparation batches will be qualified as not detected at the reporting limit. No other data are qualified due to the blank contamination.

The results for the method blanks are summarized in Table 3-12 of the Report Tables document.

Fifteen equipment blanks and one field blank were submitted for analysis. All sixteen of these blanks showed some level of contamination. Most of the observed values were between the detection and the reporting limit and are much less than the values observed in the associated samples. However, sample 012312016 gave a substantial result for phenanthrene which required a four-fold dilution (1.2 µg/L). Given the nature of the samples collected at this site (as indicated by the sample results), low level contamination is not necessarily surprising, nor does it have much impact upon the overall data since the sample concentrations are much larger than the apparent blank concentrations. Nonetheless, the result for phenanthrene in sample 012312016 is cause to qualify any phenanthrene results for samples collected contemporaneously with this equipment blank as estimated with a potential for high bias (“J+”).

3.3.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. No data are qualified as a consequence of the continuing calibration data.

The peak shapes and chromatographic resolution for the isomers benzo(b)fluoranthene and benzo(k)fluoranthene evident in the sample chromatograms for the samples indicate that the two isomers are not adequately resolved to be quantitated separately as the laboratory attempted to do. The laboratory's report narratives noted this issue but stopped short of reporting the two isomers as a coeluting pair (as is done for *m/p*-xylene). Consequently all positive results for benzo(b)fluoranthene and benzo(k)fluoranthene in all samples for these two isomers are qualified as estimated ("J").

3.3.4 Internal Standard Areas

Several sample analyses reported in this data set have internal standard areas less than 50% of the area response of the corresponding continuing calibration verification. Samples with failing internal standard areas include:

- 012512139: acenaphthene-*d*₁₀, phenanthrene-*d*₁₀
- 013012318: all
- 012412122: naphthalene-*d*₈, acenaphthene-*d*₁₀, phenanthrene-*d*₁₀
- 012712240: phenanthrene-*d*₁₀
- 013112413: acenaphthene-*d*₁₀, phenanthrene-*d*₁₀, perylene-*d*₁₂
- 020112414: naphthalene-*d*₈, acenaphthene-*d*₁₀, phenanthrene-*d*₁₀, perylene-*d*₁₂
- 020112416: phenanthrene-*d*₁₀
- 020112417: acenaphthene-*d*₁₀, phenanthrene-*d*₁₀, perylene-*d*₁₂
- 020112419: phenanthrene-*d*₁₀
- 020112434: all
- 012612190: naphthalene-*d*₈, acenaphthene-*d*₁₀, phenanthrene-*d*₁₀
- 012712205: acenaphthene-*d*₁₀, phenanthrene-*d*₁₀
- 012612191: phenanthrene-*d*₁₀
- 013012289: naphthalene-*d*₈, acenaphthene-*d*₁₀, phenanthrene-*d*₁₀

- 013012300: all
- 013012272: all
- 013012274: naphthalene-*d*₈, acenaphthene-*d*₁₀, phenanthrene-*d*₁₀

For samples where the internal standard response is less than 50% of the area response of the corresponding continuing calibration verification, the June 2008 CLP National Functional Guidelines directs the reviewer to qualify positive results associated with the low response as estimated (“J”) while non-detected values are qualified as unusable (“R”).

3.3.5 Surrogate Compound Recoveries

Two surrogates, 2-fluorobiphenyl and terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., PAHs), the surrogates reported should be adequate to monitor recovery in the analyses.

In some cases surrogate compound recoveries are reported with a 0% recovery a due to sample dilution due to high analyte concentrations or high amounts of non-target analytes present in the samples. In these cases, the laboratory appended their “S4” qualifier to indicate dilution as the cause for the low recovery. Sample dilution, when warranted, is not cause to further qualify sample results. In one instance, for sample 012412034, terphenyl-*d*₁₄ recovered above the upper limit. Since the sample was not diluted and there were no target analytes detected in the sample, the laboratory applied their “D3” qualifier to indicate the high recovery had no impact upon the sample results. Such action is consistent with guidance provided in the June 2008, NFG.

The surrogate recoveries for all samples are presented in Table 3-13 of the Report Tables document.

3.3.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on eighteen samples.

Several of the samples gave failing recoveries one or more of the analytes. Several samples also gave RPD values exceeding the laboratory limits for the respective analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. Except for those samples where more than half of the analytes failed to recover within limits (samples 020812776, 020712722, 020612657, and 020212474), no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data. For those samples where more than half of the analytes failed to recover within limits, data for only those samples are qualified as estimated (“J”, “UJ”).

The matrix spike/matrix spike duplicate results are summarized in Table 3-15 of the Report Tables document.

3.3.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. All of the analytes for all but one of the laboratory control samples recovered within the limits used by the laboratory. The lone exception is for benzo(b)fluoranthene in the LCS for batch 90937. The low recovery for this analyte in this batch is cause for qualifying all of the results for benzo(b)fluoranthene in this batch as estimated with a potential for low bias (“J”).

The laboratory control sample results are given in Table 3-14 of the Report Tables document.

3.3.8 Field Duplicates

Field duplicates generally show good agreement for all of the analytes. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate “NDs”, however, are reported with 0% RPDs.

Several of the field duplicate pairs gave RPD values for at least one analyte greater than the 30% RPD limit published in the Multi-Site QAPP Addendum. However, some of the values exceeding the 30% limit were instances where one or both results were below the reporting limit. In these instances, qualifying the data based upon values below the reporting limit is not necessary even though the Multi-Site QAPP Addendum does not explicitly make that distinction.

Results for the remaining duplicate pairs will be qualified as estimated (“J”) for the duplicate samples only.

The results of the duplicate analyses are given in Tables 3-16 the Report Tables document.

3.4 Alkylated PAHs

3.4.1 Summary

Analysis for alkylated PAHs was performed using a method developed by the analytical laboratory. The method employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM). Results are reported as compound classes (e.g., “C2-Fluroenes”) rather than specific alkylated moieties.

3.4.2 Method Blanks, Equipment Blanks, Field Blanks

The samples were prepared in seven different preparation batches. None of the target compounds for this method gave a positive result in any of the method blanks associated with these sample analyses. Therefore, no data are qualified due to method blank contamination.

The results for the method blanks are summarized in Table 3-17 of the Report Tables document.

3.4.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for the alkylated PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes except for methylphenanthrene. Calibration verifications performed on 3/6/12 and 2/16/12 gave a result greater than the specified limit. As a consequence, all results for C1-phenanthrenes/anthracenes analyzed on those two dates will be qualified as estimated with a potential for high bias (“J+”). No other data are qualified as a consequence of the continuing calibration data.

3.4.4 Surrogate Compound Recoveries

Three surrogates, 2-fluorobiphenyl, nitrobenzene-*d*₅, and terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., alkylated PAHs), the surrogates reported should be adequate to monitor recovery in the analyses. Note that the report narratives do not address failed surrogate recoveries for this test.

In a relatively small number of cases surrogate compounds recovered above the upper limit used by the laboratory. In each case the laboratory applied their “S2” qualifier to indicate the high recovery had no impact upon the sample results. Guidance in the earlier versions of the NFG is consistent with the approach taken by the laboratory when *only one surrogate recovered outside of the limits*. However, when two or more surrogates recover outside of the limits, the NFG called for qualifying the associated data as estimated. Hence, results for samples 020712703, 020312627, and 012712252 will be qualified as estimated (“J”, “UJ”).

The surrogate recoveries for all samples are presented in Table 3-21 of the Report Tables document.

3.4.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on seven samples. For this particular test, only two specific target compounds are spike and recovery measured, benzo(e)pyrene and perylene.

Several of the samples gave failing recoveries one or more of the analytes. Several samples also gave RPD values exceeding the laboratory limits for the respective analytes.

In all cases, the failed recovery is attributable to high concentration of the target analyte relative to the amount of material spiked into the sample (i.e., native concentration >4x the spike amount).

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. Since all of the failed recoveries are attributable to high native analyte concentrations, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The matrix spike/matrix spike duplicate results are summarized in Table 3-19 of the Report Tables document.

3.4.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. As is true for the matrix spike/matrix spike duplicate analyses, only two specific target compounds are spike and recovery measured, benzo(e)pyrene and perylene.

All of the analytes for all of the laboratory control samples recovered within the limits used by the laboratory. No data are qualified based upon laboratory control sample results.

The laboratory control sample results are given in Table 3-18 of the Report Tables document.

3.4.7 Field Duplicates

Six field duplicate pairs were analyzed for this set of samples. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate “NDs”, however, are reported with 0% RPDs.

Four of the six field duplicates gave RPD values for at least one analyte greater than the 30% RPD limit published in the Multi-Site QAPP Addendum. However, some of the values exceeding the 30% limit were instances where both results were below the reporting limit. In these instances, qualifying the data based upon two values below the reporting limit is not necessary even though the Multi-Site QAPP Addendum does not explicitly make that distinction.

Results for the remaining duplicate pairs will be qualified as estimated (“J”) for the duplicate samples only.

The results of the duplicate analyses are given in Table 3-20 of the Report Tables document.

3.5 SW-846 Method 8082A, Polychlorinated Biphenyls (PCBs)

3.5.1 Summary

Sediment samples were analyzed for polychlorinated biphenyls (PCBs) using SW-846 Method 8082A. Method 8082A employs gas chromatographic separation with a halogen specific electron capture detector. Identification is accomplished by comparing retention times and elution patterns to known standards and confirmed by analysis on a second gas chromatographic column of dissimilar phase.

Overall, analytical batch QC data indicated acceptable precision and accuracy.

The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples.

3.5.2 Sample Receipt

All samples were received by the laboratory in good condition, cold ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) and intact. All samples were prepared and analyzed within the prescribed holding times.

3.5.3 Method Blanks

A laboratory method blank was prepared and analyzed for each analytical batch. The method blank consisted of an aliquot of sodium sulfate extracted as a sample. None of the PCBs were detected above the detection limit in the method blanks for the sediment samples. Therefore, none of the data were flagged, and no data were adjusted as a result of blank contamination.

The method blank results are summarized in Table 3-22 of the Report Tables document.

3.5.4 Calibration

All initial calibration acceptance criteria were met for all of the analytes. Multi-point calibration curves were developed using Aroclors 1016 and 1260. The remaining Aroclor mixtures were calibrated using a single point calibration standard.

Multiple calibration verifications (CCVs) were performed in the course of these analyses. As evident from the run logs provided in the raw data packages, the laboratory routinely analyzes two successive CCV standards as part of their analytical protocol in an automated mode. The practice also appears to be to ignore the second CCV if the first one passes (as indicated by the handwritten "NA" notations) and to accept the data if the first one fails and the second one passes. While there is no specific prohibition against such practice, the reference methods and the standards for accreditation generally require some sort of corrective action between failing calibration checks. Further, other programs (e.g., the Department of Defense Environmental Laboratory Accreditation Program) specifically require that in such cases both CCVs must be evaluated and both must pass, otherwise the instrument is deemed to be out of control. Also, the

NFG do not address such circumstances. Accordingly, any failing CCV, regardless of an immediately following acceptable CCV, should be cause for qualifying data.

Several of the CCV results associated with these analyses gave failing results (i.e., >15% D using SW-846 guidance and CLP NFG for PCBs) for Aroclor 1260 on the primary column. Calibration verifications analyzed on 2/13/12, 2/15/12, 2/21/12, and 2/22/12 gave results in excess of 15% difference from the initial calibration. Therefore, as noted above, results for samples associated with these calibration verifications will be qualified as estimated (“J”). Samples affected by the failed calibration verifications are tabulated below.

Samples Associated with Failed CCVs

020712709	020712742	020612691
020712722	020712743	020912812
020712723	020712751	020912813
020712725	020312591	020912814
020712726	020812692	020912822
020712727	020612676	020912823
020712739	020612677	020912824
020712740	020612678	020912825
020712741	020612683	020912826

3.5.5 Surrogate Compound Recoveries

Two surrogates, tetrachloro-m-xylene (TCMX) and decachlorobiphenyl (DCB), were spiked into each field sample to monitor method recovery. Use of these two compounds as surrogates is consistent with the SW-846 guidance.

In several cases surrogate compound recoveries are reported with a 0% recovery a due to sample dilution because of high analyte concentrations or high amounts of non-target analytes present in the samples. In these cases, the laboratory appended their “S4” qualifier to indicate dilution as the cause for the low recovery. Sample dilution, when warranted, is not cause to further qualify sample results. All other recoveries were within limits used by the laboratory. Therefore no data are qualified due to surrogate compound recovery.

The surrogate recoveries for all sample analyses are presented in Table 3-26 of the Report Tables document.

3.5.6 Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spiked duplicate (MS/MSD) analyses were performed on seven of the samples. All of the recoveries fell within the limits used by the laboratory. No data are qualified based upon the MS/MSD results.

The MS/MSD recoveries for all sample analyses are presented in Table 3-24 of the Report Tables document.

3.5.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed for each analytical batch. None of the recoveries exceeded the laboratory's control limits for any of the PCB mixtures, hence there is no need for any further qualification of the data.

The laboratory control sample results are presented in Table 3-23 of the Report Tables document.

3.5.8 Field Duplicates

One field duplicate pair was analyzed for this set of samples. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate "NDs", however, are reported with 0% RPDs.

Two of the calculated RPD values were greater than the 30% RPD limit published in the Multi-Site QAPP Addendum. However, one of those two values exceeding the 30% limit was an instance where both results were below the reporting limit. In these instances, qualifying the data based upon two values below the reporting limit is not necessary even though the Multi-Site QAPP Addendum does not explicitly make that distinction.

Results for the remaining duplicate pair will be qualified as estimated ("J") for the duplicate samples only.

The results of the duplicate analyses are given in Table 3-25 of the Report Tables document.

Data Validation Tables

North Branch Sample Analyses

January 2012

Sample Delivery Groups:

**4056201, 4056273, 4056282, 4056309, 4056364, 4056365,
4056369, 4056370, 4056464, 4056465, 4056467, 4056468,
4056552, 4056631, 4056639, 4056647, 4056693, 4056725,
4056730, 4056754, 4056766, 4056894, 4056898, 4056899**

Pace Analytical

Prepared for



Prepared by

SHEPHERD TECHNICAL SERVICES

July 23, 2012

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Table 1-1. Sample/SDG Cross Reference

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
012312001	4056201001	200-9083-1	X	X		X		X		X	X	X	X	X	X
012312002	4056201002	200-9083-2		X		X		X		X	X	X	X		X
012312006	4056201003	200-9083-3		X		X		X		X	X	X	X		X
012312009	4056201004	200-9083-4		X		X		X		X	X	X	X		X
012312010	4056201005	200-9083-5	X	X		X		X		X	X	X	X	X	X
012312012	4056201006	200-9083-6		X		X		X		X	X	X	X		X
012312016	4056201007				X	X	X			X	X	X			
012412017	4056282001	200-9083-7	X	X		X		X		X	X	X	X	X	X
012412018	4056282002	200-9083-8	X	X		X		X		X	X	X	X	X	X
012412019	4056282003	200-9083-9		X		X		X		X	X	X	X		X
012412020	4056282004	200-9083-10		X		X		X		X	X	X	X		X
012412025	4056282005	200-9083-11		X		X		X		X	X	X	X		X
012412026	4056282006	200-9083-12		X		X		X		X	X	X	X		X
012412028	4056282007	200-9083-13		X		X		X		X	X	X	X		X
012412029	4056282008	200-9083-14		X		X		X		X	X	X	X		X
012412031	4056282009	200-9130-1	X	X		X		X		X	X	X	X		X
012412032	4056282010	200-9130-2		X		X		X		X	X	X	X		X
012412033	4056282011	200-9130-3		X		X		X		X	X	X	X		X
012412034	4056273001				X	X	X			X		X			
012412049	4056282012	200-9130-4	X	X		X		X		X	X	X	X		X
012412050	4056282013	200-9130-5		X		X		X		X	X	X	X		X
012412051	4056282014	200-9130-6		X		X		X		X	X	X	X		X
012412066	4056282015	200-9130-7	X	X		X		X		X	X	X	X	X	X
012412067	4056282016	200-9130-8		X		X		X		X	X	X	X		X
012412068	4056282017	200-9130-9		X		X		X		X	X	X	X		X
012412069	4056282018	200-9130-10		X		X		X		X	X	X	X		X
012412078	4056282019	200-9130-11		X		X		X		X	X	X	X		X
012412079	4056282020	200-9130-12	X	X		X		X		X	X	X	X	X	X
012412081	4056282021	200-9130-13		X		X		X		X	X	X	X		X
012412083	4056273002					X	X			X	X	X			

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
012412084	4056273003				X	X	X			X		X			
012512085	4056282022	200-9130-14	X	X		X		X		X	X	X	X		X
012512086	4056282023	200-9130-15		X		X		X		X	X	X	X		X
012512087	4056282024	200-9130-16		X		X		X		X	X	X	X		X
012512088	4056282025	200-9130-17		X		X		X		X	X	X	X		X
012512103	4056282026	200-9130-18	X	X		X		X		X	X	X	X		X
012512104	4056282027	200-9130-19		X		X		X		X	X	X	X		X
012512105	4056282028	200-9130-20	X	X		X		X		X	X	X	X	X	X
012512120	4056282029	200-9192-1	X	X		X		X		X	X	X	X	X	X
012512121	4056282030	200-9192-2		X		X		X		X	X	X	X		X
012512122	4056282031	200-9192-3		X		X		X		X	X	X	X		X
012512124	4056282032	200-9192-4	X	X		X		X		X	X	X	X	X	X
012512135	4056282033	200-9192-5		X		X		X			X	X	X		X
012512136	4056282034	200-9192-6		X		X		X			X	X	X		X
012512137	4056308001	200-9192-7	X	X		X		X		X	X	X	X	X	X
012512138	4056308002	200-9192-8		X		X		X		X	X	X	X		X
012512139	4056308003	200-9192-9		X		X		X		X	X	X	X		X
012512147	4056308004	200-9192-10		X		X		X		X	X	X	X		X
012512149	4056308005	200-9192-11		X		X		X		X	X	X	X		X
012612151	4056308006	200-9192-12	X	X		X		X		X	X	X	X		X
012612152	4056308007	200-9192-13		X		X		X		X	X	X	X		X
012612153	4056308008	200-9192-14		X		X		X		X	X	X	X		X
012612160	4056308009	200-9192-15	X	X		X		X		X	X	X	X	X	X
012612161	4056309001	200-9192-16		X		X		X		X	X	X	X		X
012612162	4056309002	200-9192-17		X		X		X		X	X	X	X		X
012612163	4056309003	200-9192-18	X	X		X		X		X	X	X	X		X
012612164	4056309004	200-9192-19		X		X		X		X	X	X	X		X
012612165	4056309005	200-9192-20		X		X		X		X	X	X	X		X
012612176	4056309006	200-9192-21	X	X		X		X		X	X	X	X	X	X
012612177	4056309007	200-9192-67		X		X		X		X	X	X	X		X
012612178	4056309008	200-9192-68		X		X		X		X	X	X	X		X
012612187	4056309009	200-9192-22		X		X		X		X	X	X	X		X
012612188	4056309010	200-9192-23		X		X		X		X	X	X	X		X

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
012612189	4056309011	200-9192-24	X	X		X		X		X	X	X	X		X
012612190	4056309012	200-9192-25		X		X		X		X	X	X	X		X
012612191	4056309013	200-9192-26		X		X		X		X	X	X	X		X
012712150	4056273004				X	X	X				X	X			
012712204	4056309014	200-9192-27	X	X		X		X		X	X	X	X		X
012712205	4056309015	200-9192-70		X		X		X		X	X	X	X		X
012712206	4056309016	200-9192-28		X		X		X		X	X	X	X		X
012712217	4056369001	200-9192-29	X	X		X		X		X	X	X	X		X
012712218	4056369002			X		X		X		X	X	X	X		
012712219	4056369003			X		X		X		X	X	X	X		
012712225	4056369004	200-9192-30	X	X		X		X		X	X	X	X	X	X
012712226	4056369006	200-9192-32		X		X		X		X	X	X	X		X
012712228	4056369007	200-9192-33	X	X		X		X		X	X	X	X	X	X
012712229	4056369008	200-9192-34		X		X		X		X	X	X	X		X
012712230	4056369009	200-9192-35		X		X		X		X	X	X	X		X
012712231	4056369010	200-9192-36		X		X		X		X	X	X	X		X
012712236	4056369011	200-9192-37		X		X		X		X	X	X	X		X
012712239	4056369005	200-9192-31	X	X		X		X		X	X	X	X	X	X
012712240	4056369012	200-9192-38	X	X		X		X		X	X	X	X	X	X
012712241	4056369013	200-9192-39		X		X		X		X	X	X	X		X
012712242	4056369014	200-9192-40		X		X		X		X		X	X		X
012712246	4056369015	200-9192-41		X		X		X		X	X	X	X		X
012712252	4056369016	200-9192-42	X	X		X		X		X	X	X	X	X	X
012712253	4056369017	200-9192-69	X	X		X		X		X	X	X	X		X
013012255	4056365001					X	X			X	X	X	X		
013012256	4056370001	200-9192-43	X	X		X		X		X	X	X	X		X
013012257	4056370002	200-9192-44		X		X		X		X	X	X	X		X
013012258	4056370003	200-9192-45		X		X		X		X	X	X	X		X
013012259	4056370004	200-9192-46		X		X		X		X	X	X	X		X
013012272	4056370011	200-9192-53	X	X		X		X		X	X	X	X	X	X
013012273	4056370012	200-9192-54		X		X		X		X	X	X	X		X
013012274	4056370013	200-9192-55		X		X		X		X	X	X	X		X
013012280	4056364001	200-9192-56	X	X		X		X		X	X	X	X	X	X

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
013012284	4056364002	200-9192-57		X		X		X		X	X	X	X		X
013012285	4056364003	200-9192-58		X		X		X		X	X	X	X		X
013012287	4056370005	200-9192-47	X	X		X		X		X	X	X	X	X	X
013012288	4056370006	200-9192-48		X		X		X		X	X	X	X		X
013012289	4056370007	200-9192-49		X		X		X		X	X	X	X		X
013012295	4056370008	200-9192-50		X		X		X		X	X	X	X		X
013012299	4056370009	200-9192-51		X		X		X		X	X	X	X		X
013012300	4056370010	200-9192-52		X		X		X		X	X	X	X		X
013012302	4056364004	200-9192-59	X	X		X		X		X	X	X	X	X	X
013012303	4056364005	200-9192-60	X	X		X		X		X	X	X	X	X	X
013012304	4056364006	200-9192-61		X		X		X		X	X	X	X		X
013012305	4056364007	200-9192-62		X		X		X		X	X	X	X		X
013012318	4056364008	200-9192-63	X	X		X		X		X	X	X	X	X	X
013012319	4056364009	200-9192-64		X		X		X		X	X	X	X		X
013012320	4056364010	200-9192-65		X		X		X		X	X	X	X		X
013012330	4056364011	200-9192-66	X	X		X		X		X	X	X	X	X	X
013012331	4056364012	200-9225-1		X		X		X		X	X	X	X		X
013112333	4056365002					X	X			X	X	X	X		
013112335	4056467001	200-9225-2	X	X		X		X		X	X	X	X		X
013112336	4056467002	200-9225-3		X		X		X		X	X	X	X		X
013112337	4056467003	200-9225-4		X		X		X		X	X	X	X		X
013112350	4056467004	200-9225-5	X	X		X		X		X	X	X	X	X	X
013112351	4056467005	200-9225-6		X		X		X		X	X	X	X		X
013112352	4056467006	200-9225-7		X		X		X		X	X	X	X		X
013112363	4056467007	200-9225-8		X		X		X		X	X	X	X		X
013112364	4056467008	200-9225-9		X		X		X		X	X	X	X		X
013112365	4056467009	200-9225-10	X	X		X		X		X	X	X	X		X
013112366	4056467010	200-9225-11		X		X		X		X	X	X	X		X
013112367	4056467011	200-9225-12		X		X		X		X	X	X	X		X
013112382	4056467012	200-9225-13	X	X		X		X		X	X	X	X		X
013112383	4056467013	200-9225-14		X		X		X		X	X	X	X		X
013112384	4056467014	200-9225-15		X		X		X		X	X	X	X		X
013112397	4056466001	200-9225-16	X	X		X		X		X	X	X	X	X	X

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
013112398	4056466002	200-9225-17		X		X		X		X	X	X	X		X
013112399	4056466003	200-9225-18		X		X		X		X	X	X	X		X
013112412	4056466004	200-9225-19	X	X		X		X		X	X	X	X	X	X
013112413	4056466005	200-9225-21		X		X		X		X	X	X	X		X
020112334	4056365003					X	X			X	X	X	X		
020112414	4056466006	200-9225-20	X	X		X		X		X	X	X	X	X	X
020112415	4056466007	200-9225-22		X		X		X		X	X	X	X		X
020112416	4056466008	200-9225-23		X		X		X		X	X	X	X		X
020112417	4056466009	200-9225-24		X		X		X		X	X	X	X		X
020112418	4056466010	200-9225-25	X	X		X		X		X	X	X	X		X
020112419	4056466011	200-9225-26		X		X		X		X	X	X	X		X
020112420	4056466012	200-9225-47	X	X		X		X		X	X	X	X	X	X
020112433	4056468001	200-9225-27	X	X		X		X		X	X	X	X	X	X
020112434	4056468002	200-9225-28		X		X		X		X	X	X	X		X
020112435	4056468003	200-9225-29		X		X		X		X	X	X	X		X
020112436	4056468004	200-9225-30		X		X		X		X	X	X	X		X
020112437	4056468005	200-9225-31		X		X		X		X	X	X	X		X
020112438	4056468006	200-9225-32	X	X		X		X		X	X	X	X		X
020112439	4056468007	200-9225-33		X		X		X		X	X	X	X		X
020112440	4056468008	200-9225-34		X		X		X		X	X	X	X		X
020112442	4056468010			X		X		X		X	X	X			
020112445	4056468011	200-9225-36		X		X		X		X	X	X	X		X
020112447	4056468012	200-9225-37		X		X		X		X	X	X	X		X
020112450	4056465001	200-9225-38	X	X		X		X		X	X	X	X	X	X
020112451	4056465002	200-9225-39		X		X		X		X	X	X	X		X
020112452	4056465003	200-9225-40		X		X		X		X	X	X	X		X
020112465	4056465004	200-9225-41	X	X		X		X		X	X	X	X	X	X
020112466	4056465005	200-9225-42		X		X		X		X	X	X	X		X
020112467	4056465006	200-9225-43	X	X		X		X		X	X	X	X		X
020112468	4056465007	200-9225-44		X		X		X		X	X	X	X		X
020112469	4056465008	200-9225-46		X		X		X		X	X	X	X		X
020112471	4056465009	200-9225-45		X		X		X		X	X	X	X		X
020112473	4056468009	200-9225-35	X	X		X		X		X	X	X	X	X	X

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
020212472	4056464001				X	X	X			X	X	X			
020212474	4056552001	200-9269-1	X	X		X		X		X	X	X	X	X	X
020212475	4056552002	200-9269-2		X		X		X		X	X	X	X		X
020212476	4056552003	200-9269-3		X		X		X		X	X	X	X		X
020212482	4056552004	200-9269-4		X		X		X		X	X	X	X		X
020212490	4056552005	200-9269-5		X		X		X		X	X	X	X		X
020212492	4056552006	200-9269-6	X	X		X		X		X	X	X	X		X
020212493	4056552007	200-9269-7		X		X		X		X	X	X	X		X
020212494	4056552008	200-9269-8		X		X		X		X	X	X	X		X
020212509	4056552009	200-9269-9	X	X		X		X		X	X	X	X		X
020212510	4056552010	200-9269-64		X		X		X		X	X	X	X		X
020212511	4056552011	200-9269-65		X		X		X		X	X	X	X		X
020212526	4056552012	200-9269-10	X	X		X		X		X	X	X	X	X	X
020212527	4056552013	200-9269-11		X		X		X		X	X	X	X		X
020212528	4056553001	200-9269-12		X		X		X		X	X	X	X		X
020212540	4056553002	200-9269-13		X		X		X		X	X	X	X		X
020212541	4056553003	200-9269-14	X	X		X		X		X	X	X	X	X	X
020212542	4056553005	200-9269-16		X		X		X		X	X	X	X		X
020212543	4056553006	200-9269-17	X	X		X		X		X	X	X	X		X
020212544	4056553007	200-9269-18		X		X		X		X	X	X	X		X
020212545	4056553008	200-9269-19		X		X		X		X	X	X	X		X
020212558	4056553004	200-9269-15	X	X		X		X		X	X	X	X	X	X
020312491	4056464002				X	X	X			X	X	X			
020312559	4056631001	200-9269-20	X	X		X		X	X	X	X	X	X	X	X
020312560	4056631002	200-9269-21		X		X		X	X	X	X	X	X		X
020312561	4056631003	200-9269-22		X		X		X	X	X	X	X	X		X
020312568	4056631004	200-9269-23		X		X		X	X	X	X	X	X		X
020312569	4056631005	200-9269-24	X	X		X		X	X	X	X	X	X	X	X
020312575	4056631007	200-9269-26		X		X		X	X	X	X	X	X		X
020312576	4056631006	200-9269-25	X	X		X		X	X	X	X	X	X	X	X
020312577	4056631008	200-9269-27	X	X		X		X	X	X	X	X	X	X	X
020312578	4056631009	200-9269-28		X		X		X	X	X	X	X	X		X
020312579	4056631010	200-9269-29		X		X		X	X	X	X	X	X		X

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
020312587	4056631011	200-9269-30		X		X		X	X	X	X	X	X		X
020312591	4056631012	200-9269-31	X	X		X		X	X	X	X	X	X	X	X
020312592	4056631013	200-9269-66		X		X		X	X	X	X	X	X		X
020312594	4056631014	200-9269-32	X	X		X		X	X	X	X	X	X	X	X
020312595	4056631015	200-9269-33		X		X		X	X	X	X	X	X		X
020312596	4056631016	200-9269-34		X		X		X	X	X	X	X	X		X
020312608	4056631017	200-9269-35	X	X		X		X	X	X	X	X	X	X	X
020312609	4056631018	200-9269-36		X		X		X	X	X	X	X	X		X
020312612	4056631019	200-9269-37	X	X		X		X	X	X	X	X	X	X	X
020312613	4056631020	200-9269-38		X		X		X	X	X	X	X	X		X
020312614	4056631021	200-9269-39		X		X		X	X	X	X	X	X		X
020312627	4056631022	200-9269-40	X	X		X		X	X	X	X	X	X	X	X
020312628	4056631023	200-9269-41		X		X		X	X	X	X	X	X		X
020612611	4056639001				X	X	X		X	X	X	X			
020612629	4056631024	200-9269-42	X	X		X		X	X	X	X	X	X	X	X
020612630	4056631025	200-9269-43		X		X		X	X	X	X	X	X		X
020612631	4056631026	200-9269-44	X	X		X		X	X	X	X	X	X	X	X
020612639	4056631027	200-9269-45		X		X		X	X	X	X	X	X		X
020612640	4056631029	200-9269-47		X		X		X	X	X	X	X	X		X
020612641	4056631028	200-9269-46		X		X		X	X	X	X	X	X		X
020612643	4056631030	200-9269-48	X	X		X		X	X	X	X	X	X	X	X
020612644	4056631031	200-9269-49		X		X		X	X	X	X	X	X		X
020612645	4056631032	200-9269-50		X		X		X	X	X	X	X	X		X
020612657	4056631033	200-9269-51		X		X		X	X	X	X	X	X		X
020612658	4056631034	200-9269-52		X		X		X	X	X	X	X	X		X
020612659	4056631035	200-9269-53	X	X		X		X	X	X	X	X	X	X	X
020612660	4056631036	200-9269-54		X		X		X	X	X	X	X	X		X
020612661	4056631037	200-9269-55		X		X		X	X	X	X	X	X		X
020612662	4056631038	200-9269-56		X		X		X	X	X	X	X	X		X
020612674	4056631039	200-9269-57		X		X		X	X	X	X	X	X		X
020612675	4056631040	200-9269-58	X	X		X		X	X	X	X	X	X	X	X
020612676	4056631041	200-9269-59	X	X		X		X	X	X	X	X	X	X	X
020612677	4056631042	200-9269-60		X		X		X	X	X	X	X	X		X

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
020612678	4056631043	200-9269-61		X		X		X	X	X	X	X	X		X
020612683	4056631044	200-9269-62	X	X		X		X	X	X	X	X	X	X	X
020612691	4056631045	200-9269-63		X		X		X	X	X	X	X	X		X
020712642	4056639002				X	X	X		X	X	X	X			
020712693	4056693001	200-9310-1	X	X		X		X	X	X	X	X	X	X	X
020712694	4056693002	200-9310-2		X		X		X	X	X	X	X	X		X
020712703	4056693004	200-9310-4	X	X		X		X	X	X	X	X	X	X	X
020712704	4056693005	200-9310-5		X		X		X	X	X	X	X	X		X
020712705	4056693006	200-9310-6		X		X		X	X	X	X	X	X		X
020712706	4056693003	200-9310-3		X		X		X	X	X	X	X	X		X
020712707	4056693007	200-9310-7	X	X		X		X	X	X	X	X	X	X	X
020712708	4056693008	200-9310-8		X		X		X	X	X	X	X	X		X
020712709	4056693009	200-9310-9	X	X		X		X	X	X	X	X	X	X	X
020712722	4056693010	200-9310-10		X		X		X	X	X	X	X	X		X
020712723	4056693011	200-9310-11		X		X		X	X	X	X	X	X		X
020712725	4056730001	200-9310-12	X	X		X		X	X	X	X	X	X	X	X
020712726	4056730002	200-9310-13		X		X		X	X	X	X	X	X		X
020712727	4056730003	200-9310-14		X		X		X	X	X	X	X	X		X
020712739	4056730004	200-9310-15	X	X		X		X	X	X	X	X	X	X	X
020712740	4056730005	200-9310-16		X		X		X	X	X	X	X	X		X
020712741	4056730006	200-9310-17	X	X		X		X	X	X	X	X	X	X	X
020712742	4056730007	200-9310-18		X		X		X	X	X	X	X	X		X
020712743	4056730008	200-9310-19		X		X		X	X	X	X	X	X		X
020712751	4056730009	200-9310-20		X		X		X	X	X	X	X	X		X
020712755	4056730010	200-9310-21	X	X		X		X	X	X	X	X	X	X	X
020812724	4056725001				X	X	X			X	X	X			
020812759	4056730011	200-9310-22	X	X		X		X	X	X	X	X	X	X	X
020812760	4056730012	200-9310-23		X		X		X	X	X	X	X	X		X
020812761	4056730013	200-9310-24		X		X		X	X	X	X	X	X		X
020812764	4056730014	200-9310-25		X		X		X	X	X	X	X	X		X
020812765	4056730016	200-9310-27		X		X		X	X	X	X	X	X		X
020812769	4056730017	200-9310-28	X	X		X		X	X	X	X	X	X	X	X
020812770	4056730015	200-9310-26		X		X		X	X	X	X	X	X		X

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
020812772	4056730018	200-9310-29	X	X		X		X	X	X	X	X	X	X	X
020812773	4056730019	200-9310-30		X		X		X	X	X	X	X	X		X
020812776	4056730020	200-9310-31	X	X		X		X	X	X	X	X	X	X	X
020812777	4056730021	200-9310-32		X		X		X	X	X	X	X	X		X
020812779	4056730022	200-9310-33	X	X		X		X	X	X	X	X	X	X	X
020812780	4056730023	200-9310-34		X		X		X	X	X	X	X	X		X
020812781	4056730024	200-9310-35		X		X		X	X	X	X	X	X		X
020812790	4056730025	200-9310-36	X	X		X		X	X	X	X	X	X	X	X
020812791	4056730026	200-9310-37		X		X		X	X	X	X	X	X		X
020812794	4056730027	200-9310-38	X	X		X		X	X	X	X	X	X	X	X
020812795	4056730028	200-9310-39		X		X		X	X	X	X	X	X		X
020812796	4056730029	200-9310-40		X		X		X	X	X	X	X	X		X
020812808	4056730030	200-9310-41	X	X		X		X	X	X	X	X	X	X	X
020812809	4056730031	200-9310-42		X		X		X	X	X	X	X	X		X
020912771	4056725002				X	X	X		X	X	X	X			
020912812	4056766001	200-9362-1	X	X		X		X	X	X	X	X	X	X	X
020912813	4056766002	200-9362-2		X		X		X	X	X	X	X	X		X
020912814	4056766003	200-9362-3	X	X		X		X	X	X	X	X	X	X	X
020912822	4056766004	200-9362-4		X		X		X	X	X	X	X	X		X
020912823	4056766005	200-9362-5		X		X		X	X	X	X	X	X		X
020912824	4056766006	200-9362-6		X		X		X	X	X	X	X	X		X
020912825	4056766007	200-9362-7	X	X		X		X	X	X	X	X	X	X	X
020912826	4056766008	200-9362-8		X		X		X	X	X	X	X	X		X
020912827	4056766009	200-9362-9		X		X		X	X	X	X	X	X		X
020912835	4056766010	200-9362-10	X	X		X		X	X	X	X	X	X	X	X
020912841	4056766011	200-9362-11		X		X		X	X	X	X	X	X		X
020912842	4056766012	200-9362-12	X	X		X		X	X	X	X	X	X	X	X
020912843	4056766013	200-9362-13		X		X		X	X	X	X	X	X		X
020912844	4056766014	200-9362-14		X		X		X	X	X	X	X	X		X
020912854	4056766015	200-9362-15		X		X		X	X	X	X	X	X		X
020912855	4056766016	200-9362-16		X		X		X	X	X	X	X	X		X
020912858	4056766017	200-9362-17	X	X		X		X	X	X	X	X	X	X	X
020912861	4056766018	200-9362-18		X		X		X	X	X	X	X	X		X

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
020912868	4056766019	200-9362-19		X		X		X	X	X	X	X	X		X
021012811	4056725004				X	X	X		X	X	X	X			
021012870	4056898001	200-9362-20	X	X		X		X	X	X	X	X	X	X	X
021012871	4056898002	200-9362-21	X	X		X		X	X	X	X	X	X	X	X
021012873	4056898003	200-9362-22		X		X		X	X	X	X	X	X		X
021012882	4056898004	200-9362-23		X		X		X	X	X	X	X	X		X
021012883	4056898005	200-9362-24		X		X		X	X	X	X	X	X		X
021012884	4056898006	200-9362-25	X	X		X		X	X	X	X	X	X	X	X
021012885	4056898007	200-9362-26		X		X		X	X	X	X	X	X		X
021012886	4056898008	200-9362-27		X		X		X	X	X	X	X	X		X
021012887	4056898009	200-9362-28	X	X		X		X	X	X	X	X	X	X	X
021012888	4056898010	200-9362-29	X	X		X		X	X	X	X	X	X	X	X
021012889	4056898011	200-9362-30		X		X		X	X	X	X	X	X		X
021012890	4056898012	200-9362-31		X		X		X	X	X	X	X	X		X
021012898	4056898013	200-9362-32	X	X		X		X	X	X	X	X	X	X	X
021012899	4056898015	200-9362-34		X		X		X	X	X	X	X	X		X
021012901	4056898014	200-9362-33	X	X		X		X	X	X	X	X	X	X	X
021012902	4056898016	200-9362-35	X	X		X		X	X	X	X	X	X	X	X
021012903	4056898017	200-9362-36	X	X		X		X	X	X	X	X	X	X	X
021012904	4056898018	200-9362-37		X		X		X	X	X	X	X	X		X
021012905	4056898019	200-9362-38		X		X		X	X	X	X	X	X		X
021012915	4056898022	200-9362-41		X		X		X	X	X	X	X	X		X
021012916	4056898023	200-9362-42		X		X		X	X	X	X	X	X		X
021012918	4056898020	200-9362-39	X	X		X		X	X	X	X	X	X	X	X
021012919	4056898021	200-9362-40	X	X		X		X	X	X	X	X	X	X	X
021312869	4056894001				X	X	X		X	X	X	X			
021312920	4056898024	200-9362-43	X	X		X		X	X	X	X	X	X	X	X
021312921	4056898025	200-9362-44		X		X		X	X	X	X	X	X		X
021312922	4056898026	200-9362-45		X		X		X	X	X	X	X	X		X
021312929	4056898027	200-9362-46	X	X		X		X	X	X	X	X	X	X	X
021312933	4056898028	200-9362-47		X		X		X	X	X	X	X	X		X
021312934	4056898029	200-9362-48		X		X		X	X	X	X	X	X		X
021312935	4056898030	200-9362-49	X	X		X		X	X	X	X	X	X	X	X

Field ID	Pace Sample ID	Test America Sample ID	Alkylated PAH - SIM	ASTM D2974-87	EPA 335.4	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 - SIM	EPA 9012	Black Carbon	Total Organics
021312936	4056898031	200-9362-50		X		X		X		X	X	X	X		X
021312937	4056898032	200-9362-51		X		X		X		X	X	X	X		X
021312945	4056898033	200-9362-52	X	X		X		X		X	X	X	X	X	X
021312946	4056898034	200-9362-53		X		X		X		X	X	X	X		X
021312948	4056898035	200-9362-54	X	X		X		X		X	X	X	X	X	X
021312949	4056898036	200-9362-55		X		X		X		X	X	X	X		X
021312950	4056898038	200-9362-57		X		X		X		X	X	X	X		X
021312958	4056898039	200-9362-58		X		X		X		X	X	X	X		X
021312960	4056898040	200-9362-59	X	X		X		X		X	X	X	X	X	X
021312961	4056898041	200-9362-60		X		X		X		X	X	X	X		X
021312963	4056898037	200-9362-56		X		X		X		X	X	X	X		X
021312964	4056898042	200-9362-61	X	X		X		X		X	X	X	X	X	X
021312965	4056898043	200-9362-62		X		X		X		X	X	X	X		X
021312966	4056898044	200-9362-63		X		X		X		X	X	X	X		X
021312971	4056898045	200-9362-64		X		X		X		X	X	X	X		X
021312972	4056898046	200-9362-65	X	X		X		X		X	X	X	X	X	X
021312973	4056898047	200-9362-66		X		X		X		X	X	X	X		X
021312975	4056898048	200-9362-67	X	X		X		X		X	X	X	X	X	X
021312976	4056898049	200-9362-68		X		X		X		X	X	X	X		X
021312977	4056898050	200-9362-69		X		X		X		X	X	X	X		X
021312981	4056898051	200-9362-70		X		X		X		X	X	X	X		X
021312985	4056898052	200-9362-71	X	X		X		X		X	X	X	X	X	X
021312987	4056898053	200-9362-72		X		X		X		X	X	X	X		X
021312988	4056898054	200-9362-73		X		X		X		X	X	X	X		X
TRIP 012712	4056273005									X					
TRIP 021512	4056894002									X					
TRIP020112	4056365004									X					
TRIP020312	4056464003									X					
TRIP020912	4056725003									X					

Table 2-1. Inorganic Analytes and Methods Summary

Analytical Method	Analyte
EPA 335.4	Available Cyanide
EPA 6020	Metals
EPA 7470/7471	Mercury
EPA 9012	Cyanide
ASTM D2974-87	Percent Moisture
Lloyd_Kahn_BC	Black Carbon
Lloyd_Kahn_Mod	Total Organic Carbon

Table 2-2. Total Metals Method Blank Results Summary Water Samples (µg/L)

Analyte	QC Batch: 90858	QC Batch: 91526	QC Batch: 91952	QC Batch: 92135	QC Batch: 92647
Aluminum		250 U	250 U	28.6 J	
Antimony		1.0 U	1.0 U	1.0 U	
Arsenic	1.0 U	1.0 U	1.0 U	1.0 U	
Barium	1.0 U	1.0 U	1.0 U	1.0 U	
Beryllium	1.0 U	1.0 U			
Cadmium	1.0 U	1.0 U	1.0 U	1.0 U	
Chromium	1.0 U	0.13 J	1.0 U	1.0 U	
Copper	1.0 U	1.0 U	1.0 U	1.0 U	
Iron		17.2 J	250 U	35.8 J	
Lead	1.0 U	1.0 U	1.0 U	1.0 U	
Manganese		1.0 U	1.0 U		1.0 U
Nickel	1.0 U	1.0 U	1.0 U	1.0 U	
Selenium	1.0 U	1.0 U	1.0 U	1.0 U	
Silver	0.50 U	0.50 U	0.50 U	0.50 U	
Vanadium		1.0 U	1.0 U	1.0 U	
Zinc	10.0 U	10.0 U	10.0 U	10.0 U	

Table 2-2. Total Metals Method Blank Results Summary Soil Samples (mg/Kg)

Analyte	QC Batch: 90867	QC Batch: 90870	QC Batch: 91226	QC Batch: 91227	QC Batch: 91254	QC Batch: 91255	QC Batch: 91350	QC Batch: 91351	QC Batch: 91438	QC Batch: 92198
Arsenic	0.10 U									
Barium	0.013 J	0.10 U	0.011 J	0.016 J	0.10 U	0.015 J	0.015 J	0.012 J	0.10 U	0.10 U
Beryllium	0.10 U									
Cadmium	0.10 U									
Chromium	0.034 J	0.038 J	0.017 J	0.032 J	0.024 J	0.049 J	0.031 J	0.031 J	0.05 J	0.032 J
Copper	0.10 U	0.10 U	0.10 U	0.068 J	0.10 U	0.16				
Lead	0.013 J	0.10 U	0.10 U	0.016 J	0.10 U	0.039 J	0.012 J	0.011 J	0.012 J	0.015 J
Nickel	0.10 U									
Selenium	0.10 U									
Silver	0.050 U									
Zinc	1 J	2.0 U								

Table 2-2. Total Metals Method Blank Results Summary Soil Samples (mg/Kg) Continued

Analyte	QC Batch: 91558	QC Batch: 91561	QC Batch: 91623	QC Batch: 91741	QC Batch: 91843	QC Batch: 91844	QC Batch: 92150	QC Batch: 92154
Aluminum	25.0 U							
Antimony	0.10 U							
Arsenic	0.10 U							
Barium	0.011 J	0.10 U	0.01 J	0.10 U	0.025 J	0.10 U	0.011 J	0.10 U
Beryllium	0.10 U							0.10 U
Cadmium	0.10 U							
Chromium	0.025 J	0.029 J	0.041 J	0.031 J	0.054 J	0.024 J	0.041 J	0.034 J
Copper	0.10 U							
Iron	3.6 J	25.0 U	3 J	25.0 U	3.5 J	25.0 U	25.0 U	4.6 J
Lead	0.0088 J	0.10 U	0.021 J	0.10 U	0.014 J	0.0086 J	0.016 J	0.012 J
Manganese	0.063 J	0.10 U	0.10 U	0.10 U	0.087 J	0.10 U	0.10 U	0.049 J
Nickel	0.10 U							
Selenium	0.10 U							
Silver	0.050 U							
Vanadium	0.10 U	0.034 J	0.10 U					
Zinc	2.0 U							

Table 2-3. Mercury Method Blank Results Summary Water Samples (µg/L)

Batch	Result
QC Batch: 91661	0.20 U
QC Batch: 92134	0.20 U
QC Batch: 92350	0.1 J
QC Batch: 92621	0.20 U
QC Batch: 92826	0.20 U

Table 2-3. Mercury Method Blank Results Summary Soil Samples (mg/Kg)

Batch	Result
QC Batch: 91545	0.0047 U
QC Batch: 91557	0.0047 U
QC Batch: 91765	0.0047 U
QC Batch: 91809	0.0047 U
QC Batch: 91915	0.0047 U
QC Batch: 91916	0.0047 U
QC Batch: 92088	0.0047 U
QC Batch: 92089	0.0047 U
QC Batch: 92289	0.0024 J
QC Batch: 92395	0.0047 U

Batch	Result
QC Batch: 92396	0.0047 U
QC Batch: 92405	0.0031 J
QC Batch: 92474	0.0047 U
QC Batch: 92475	0.0047 U
QC Batch: 92615	0.0047 U
QC Batch: 92652	0.0070 U
QC Batch: 92875	0.0047 U
QC Batch: 92876	0.0047 U
QC Batch: 92877	0.0047 U

Table 2-4. Cyanide 9012 Method Blank Results Summary

Batch	Units	Result
QC Batch: 91521	mg/L	0.020 U
QC Batch: 91130	mg/kg	0.60 U
QC Batch: 91131	mg/kg	0.60 U
QC Batch: 91132	mg/kg	0.60 U
QC Batch: 91208	mg/kg	0.60 U
QC Batch: 91333	mg/kg	0.60 U
QC Batch: 91334	mg/kg	0.60 U
QC Batch: 91520	mg/kg	0.60 U
QC Batch: 91725	mg/kg	0.60 U
QC Batch: 91727	mg/kg	0.60 U

Batch	Units	Result
QC Batch: 91728	mg/kg	0.60 U
QC Batch: 91810	mg/kg	0.60 U
QC Batch: 91812	mg/kg	0.60 U
QC Batch: 91922	mg/kg	0.60 U
QC Batch: 92045	mg/kg	0.60 U
QC Batch: 92046	mg/kg	0.60 U
QC Batch: 92202	mg/kg	0.60 U
QC Batch: 92204	mg/kg	0.60 U
QC Batch: 92397	mg/kg	0.60 U
QC Batch: 92398	mg/kg	0.60 U

Table 2-5. Cyanide EPA 335.4 Method Blank Results Summary (mg/L)

Analyte	QC Batch: 90924	QC Batch: 91806	QC Batch: 92596
Cyanide	0.020 U	0.020 U	0.020 U

Table 2-6. Total Organic Carbon Method Blank Results Summary (mg/Kg)

QC Batch	Result
QC Batch: 200-33028	1000 U
QC Batch: 200-33125	1000 U
QC Batch: 200-33302	1000 U
QC Batch: 200-33345	1000 U
QC Batch: 200-33346	1000 U
QC Batch: 200-33348	1000 U
QC Batch: 200-33401	1000 U
QC Batch: 200-33469	1000 U
QC Batch: 200-33565	1000 U
QC Batch: 200-33571	1000 U
QC Batch: 200-33592	1000 U

QC Batch	Result
QC Batch: 200-33640	1000 U
QC Batch: 200-33645	1000 U
QC Batch: 200-33665	1000 U
QC Batch: 200-33739	1000 U
QC Batch: 200-33860	1000 U
QC Batch: 200-33931	1000 U
QC Batch: 200-34050	1000 U
QC Batch: 200-34074	1000 U
QC Batch: 200-34147	595.0 J
QC Batch: 200-34149	1000 U

Table 2-7. Black Carbon Method Blank Results Summary (mg/Kg)

QC Batch	Result
QC Batch: 200-33098	1000 U
QC Batch: 200-33280	1000 U
QC Batch: 200-33400	1000 U
QC Batch: 200-33552	1000 U
QC Batch: 200-33568	1000 U

QC Batch	Result
QC Batch: 200-33862	1000 U
QC Batch: 200-33866	1000 U
QC Batch: 200-34196	1000 U
QC Batch: 200-34231	630.0 J
QC Batch: 200-34249	575.0 J

Table 2-8. Total Metals Laboratory Control Sample Results Summary Water Samples

Analyte	Recovery Limits (%)		QC Batch: 91526			QC Batch: 91952			QC Batch: 92135		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
Aluminum	80	120	5000	4930	99	5000	4780	96	5000	4910	98
Antimony	80	120	500	488	98	500	493	99	500	480	96
Arsenic	80	120	500	498	100	500	485	97	500	486	97
Barium	80	120	500	474	95	500	469	94	500	475	95
Beryllium	80	120	500	502	100						
Cadmium	80	120	500	491	98	500	496	99	500	482	96
Chromium	80	120	500	479	96	500	473	95	500	480	96
Copper	80	120	500	485	97	500	460	92	500	457	91
Iron	80	120	5000	5190	104	5000	4930	99	5000	5180	104
Lead	80	120	500	474	95	500	476	95	500	494	99
Manganese	80	120	500	467	93	500	471	94			
Nickel	80	120	500	494	99	500	470	94	500	482	96
Selenium	80	120	500	508	102	500	509	102	500	496	99
Silver	80	120	250	241	96	250	240	96	250	239	95
Vanadium	80	120	500	490	98	500	479	96	500	472	94
Zinc	80	120	500	491	98	500	492	98	500	486	97

Table 2-8. Total Metals Laboratory Control Sample Results Summary Water Samples Continued 1

Analyte	Recovery Limits (%)		QC Batch: 92647			QC Batch: 90858		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
Arsenic	80	120				500	505	101
Barium	80	120				500	491	98
Beryllium	80	120				500	498	100
Cadmium	80	120				500	504	101
Chromium	80	120				500	494	99
Copper	80	120				500	509	102
Lead	80	120				500	492	98
Manganese	80	120	500	524	105			
Nickel	80	120				500	505	101
Selenium	80	120				500	508	102
Silver	80	120				250	249	100
Zinc	80	120				500	503	101

Table 2-8. Total Metals Laboratory Control Sample Results Summary Soil Samples Continued 2

Analyte	Recovery Limits (%)		QC Batch: 90867			QC Batch: 90870			QC Batch: 91226		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)
Arsenic	80	120	50	52.1	104	50	51.1	102	50	47.8	96
Barium	80	120	50	49.2	98	50	49.4	99	50	45.6	91
Beryllium	80	120	50	49.6	99	50	48.3	97	50	48.7	97
Cadmium	80	120	50	51.4	103	50	51.1	102	50	48.1	96
Chromium	80	120	50	48.7	97	50	48.8	98	50	46.0	92
Copper	80	120	50	49.1	98	50	48.8	98	50	46.7	93
Lead	80	120	50	49.8	100	50	50.3	101	50	46.0	92
Nickel	80	120	50	50.7	101	50	50.6	101	50	45.7	91
Selenium	80	120	50	53.8	108	50	52.8	106	50	48.5	97
Silver	80	120	25	24.0	96	25	24.1	96	25	24.4	98
Zinc	80	120	50	53.6	107	50	52.8	106	50	48.1	96

Table 2-8. Total Metals Laboratory Control Sample Results Summary Soil Samples Continued 3

Analyte	Recovery Limits (%)		QC Batch: 91227			QC Batch: 91254			QC Batch: 91255		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)
Arsenic	80	120	50	48.5	97	50	46.7	93	50	47.0	94
Barium	80	120	50	45.6	91	50	46.0	92	50	45.4	91
Beryllium	80	120	50	49.4	99	50	46.9	94	50	46.8	94
Cadmium	80	120	50	48.7	97	50	46.6	93	50	46.5	93
Chromium	80	120	50	46.4	93	50	46.2	92	50	46.2	92
Copper	80	120	50	47.7	95	50	45.3	91	50	45.3	91
Lead	80	120	50	45.9	92	50	45.8	92	50	45.9	92
Nickel	80	120	50	46.4	93	50	46.0	92	50	45.8	92
Selenium	80	120	50	49.9	100	50	48.5	97	50	48.8	98
Silver	80	120	25	24.4	98	25	23.6	95	25	23.5	94
Zinc	80	120	50	49.2	98	50	47.0	94	50	47.8	96

Table 2-8. Total Metals Laboratory Control Sample Results Summary Soil Samples Continued 4

Analyte	Recovery Limits (%)		QC Batch: 91350			QC Batch: 91351			QC Batch: 91438		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)
Arsenic	80	120	50	49.0	98	50	49.6	99	50	48.7	97
Barium	80	120	50	47.8	96	50	47.9	96	50	47.1	94
Beryllium	80	120	50	47.2	94	50	48.6	97	50	46.8	94
Cadmium	80	120	50	49.2	98	50	49.2	98	50	49.7	99
Chromium	80	120	50	47.3	95	50	48.2	96	50	46.4	93
Copper	80	120	50	48.6	97	50	48.7	97	50	46.8	94
Lead	80	120	50	46.9	94	50	49.9	100	50	48.2	96
Nickel	80	120	50	48.5	97	50	49.8	100	50	48.9	98
Selenium	80	120	50	49.6	99	50	49.4	99	50	49.4	99
Silver	80	120	25	24.7	99	25	24.7	99	25	23.5	94
Zinc	80	120	50	48.9	98	50	48.5	97	50	48.3	97

Table 2-8. Total Metals Laboratory Control Sample Results Summary Soil Samples Continued 5

Analyte	Recovery Limits (%)		QC Batch: 91561			QC Batch: 91623			QC Batch: 91741		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)
Aluminum	80	120	500	497	99	500	512	102	500	503	101
Antimony	80	120	50	47.2	94	50	51.2	102	50	51.7	103
Arsenic	80	120	50	48.1	96	50	50.8	102	50	49.4	99
Barium	80	120	50	46.6	93	50	50.5	101	50	48.9	98
Cadmium	80	120	50	48.1	96	50	51.9	104	50	50.5	101
Chromium	80	120	50	45.3	91	50	49.7	99	50	47.9	96
Copper	80	120	50	48.0	96	50	49.5	99	50	48.8	98
Iron	80	120	500	488	98	500	532	106	500	518	104
Lead	80	120	50	48.7	97	50	51.0	102	50	49.3	99
Manganese	80	120	50	46.4	93	50	50.5	101	50	48.9	98
Nickel	80	120	50	47.8	96	50	51.9	104	50	50.3	101
Selenium	80	120	50	48.4	97	50	51.6	103	50	50.0	100
Silver	80	120	25	24.2	97	25	25.1	101	25	24.6	99
Vanadium	80	120	50	45.7	91	50	49.8	100	50	47.6	95
Zinc	80	120	50	46.8	94	50	51.4	103	50	49.0	98

Table 2-8. Total Metals Laboratory Control Sample Results Summary Soil Samples Continued 6

Analyte	Recovery Limits (%)		QC Batch: 91843			QC Batch: 91844			QC Batch: 92150		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)
Aluminum	80	120	500	509	102	500	490	98	500	487	97
Antimony	80	120	50	48.3	97	50	49.4	99	50	53.0	106
Arsenic	80	120	50	49.1	98	50	49.0	98	50	48.8	98
Barium	80	120	50	47.8	96	50	47.8	96	50	48.0	96
Cadmium	80	120	50	49.6	99	50	48.8	98	50	49.9	100
Chromium	80	120	50	46.8	94	50	46.8	94	50	50.8	102
Copper	80	120	50	46.0	92	50	50.1	100	50	50.2	100
Iron	80	120	500	490	98	500	512	102	500	520	104
Lead	80	120	50	47.8	96	50	48.1	96	50	50.1	100
Manganese	80	120	50	48.2	96	50	48.0	96	50	50.0	100
Nickel	80	120	50	46.8	94	50	48.9	98	50	48.9	98
Selenium	80	120	50	50.6	101	50	49.8	100	50	49.4	99
Silver	80	120	25	22.7	91	25	24.0	96	25	26.4	106
Vanadium	80	120	50	47.9	96	50	47.4	95	50	50.4	101
Zinc	80	120	50	48.1	96	50	48.3	97	50	49.8	100

Table 2-8. Total Metals Laboratory Control Sample Results Summary Soil Samples Continued 7

Analyte	Recovery Limits (%)		QC Batch: 92154			QC Batch: 92198			QC Batch: 91558		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)	Spike (mg/kg)	Result (mg/kg)	Recovery (%)
Aluminum	80	120	500	504	101				500	497	99
Antimony	80	120	50	48.5	97				50	49.7	99
Arsenic	80	120	50	48.7	97	50	49.6	99	50	48.8	98
Barium	80	120	50	48.6	97	50	48.6	97	50	47.6	95
Beryllium	80	120	50	48.5	97	50	50.2	100	50	51.0	102
Cadmium	80	120	50	49.1	98	50	51.6	103	50	48.6	97
Chromium	80	120	50	47.7	95	50	51.3	103	50	47.6	95
Copper	80	120	50	48.2	96	50	50.6	101	50	47.8	96
Iron	80	120	500	519	104				500	498	100
Lead	80	120	50	49.6	99	50	51.0	102	50	49.2	98
Manganese	80	120	50	47.4	95				50	47.5	95
Nickel	80	120	50	48.5	97	50	48.9	98	50	49.0	98
Selenium	80	120	50	49.8	100	50	51.0	102	50	48.8	98
Silver	80	120	25	24.5	98	25	26.8	107	25	24.9	100
Vanadium	80	120	50	47.7	95				50	47.8	96
Zinc	80	120	50	48.6	97	50	50.8	102	50	48.4	97

Table 2-9. Mercury Laboratory Control Sample Results Summary

QC Batch for Mercury	Units	Recovery Limits (%)		Spike	Result	Recovery
		Lower	Upper			
91661	µg/L	85	115	5	4.9	98
92134	µg/L	85	115	5	5.1	102
92350	µg/L	85	115	5	4.9	98
92621	µg/L	85	115	5	5.0	100
92826	µg/L	85	115	5	5.1	102
91545	mg/Kg	85	115	.17	0.15	89
91557	mg/Kg	85	115	.17	0.17	99
91765	mg/Kg	85	115	.17	0.16	98
91809	mg/Kg	85	115	.17	0.17	101
91915	mg/Kg	85	115	.17	0.16	97
91916	mg/Kg	85	115	.17	0.17	101
92088	mg/Kg	85	115	.17	0.17	102
92089	mg/Kg	85	115	.17	0.18	105
92289	mg/Kg	85	115	.17	0.17	102
92395	mg/Kg	85	115	.17	0.17	101
92396	mg/Kg	85	115	.17	0.16	96
92405	mg/Kg	85	115	.17	0.17	99
92474	mg/Kg	85	115	.17	0.18	105
92475	mg/Kg	85	115	.17	0.18	111
92615	mg/Kg	85	115	.17	0.17	104
92652	mg/Kg	85	115	.17	0.22	133
92875	mg/Kg	85	115	.17	0.16	98
92876	mg/Kg	85	115	.17	0.16	99
92877	mg/Kg	85	115	.17	0.16	96

Table 2-10. Cyanide Laboratory Control Sample Results Summary

QC Batch for Cyanide	Units	Recovery Limits (%)		Spike	Result	Recovery
		Lower	Upper			
90924 - 335.4	mg/L	90	110	.1	0.096	96
91806 - 335.4	mg/L	90	110	.1	0.11	108
92596 - 335.4	mg/L	90	110	.1	0.11	105
91521	mg/L	90	110	.1	0.092	92
91130	mg/Kg	80	120	3	2.8	94
91131	mg/Kg	80	120	3	3.1	103
91132	mg/Kg	80	120	3	2.9	97
91208	mg/Kg	80	120	3	3.0	101
91333	mg/Kg	80	120	3	2.6	88
91334	mg/Kg	80	120	3	2.8	93
91520	mg/Kg	80	120	3	2.5	82
91725	mg/Kg	80	120	3	3.3	108
91727	mg/Kg	80	120	3	3.1	104
91728	mg/Kg	80	120	3	3.0	99
91810	mg/Kg	80	120	3	3.0	101
91812	mg/Kg	80	120	3	3.2	105
91922	mg/Kg	80	120	3	2.8	95
92045	mg/Kg	80	120	3	3.0	102
92046	mg/Kg	80	120	3	3.0	99
92202	mg/Kg	80	120	3	3.0	102
92204	mg/Kg	80	120	3	3.0	98
92397	mg/Kg	80	120	3	3.2	106
92398	mg/Kg	80	120	3	2.9	96

Table 2-11. Total Organic Carbon Laboratory Control Sample Results Summary

QC Batch for Total Organic Carbon	Recovery Limits (%)		Spike (mg/Kg)	Result (mg/Kg)	Recovery
	Lower	Upper			
200-33028	75	125	12600	10360	82
200-33125	75	125	12600	11120	88
200-33302	75	125	12600	10990	87
200-33345	75	125	12600	12660	100
200-33346	75	125	12600	12330	98
200-33348	75	125	12600	11600	92
200-33401	75	125	12600	11270	89
200-33469	75	125	12600	11220	89
200-33565	75	125	12600	11660	93
200-33571	75	125	12600	11780	93
200-33592	75	125	12600	11370	90
200-33640	75	125	12600	12060	96
200-33645	75	125	12600	12170	97
200-33665	75	125	12600	11940	95
200-33739	75	125	12600	11520	91
200-33860	75	125	12600	12070	96
200-33931	75	125	12600	12350	98
200-34050	75	125	12600	12210	97
200-34074	75	125	12600	13690	109
200-34147	75	125	12600	11770	93
200-34149	75	125	12600	11740	93

Table 2-12. Black Carbon Laboratory Control Sample Results Summary

QC Batch for Black Carbon	Recovery Limits (%)		Spike (mg/Kg)	Result (mg/Kg)	Recovery
	Lower	Upper			
200-33098	50	150	9900	14180	143
200-33280	50	150	9900	10710	108
200-33400	50	150	9900	12150	123
200-33552	50	150	9900	10950	111
200-33568	50	150	9900	11940	121
200-33862	50	150	9900	10030	101
200-33866	50	150	9900	12610	127
200-34196	50	150	9900	14230	144
200-34231	50	150	9900	12390	125
200-34249	50	150	9900	11320	114

Table 2-13. EPA 6020 MS/MSD Sample 012412078

Analyte	MS Sample ID: 012412078			MSD Sample ID: 012412078			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	103	113	101	103	112	100	1	10.1
Barium	103	505	148	103	545	189	8	352 M0
Beryllium	103	101	98	103	100	97	1	0.84 JD3
Cadmium	103	177	106	103	174	104	2	67.7
Chromium	103	704	145	103	728	169	3	555 P6
Copper	103	632	127	103	651	147	3	502 P6
Lead	103	1190	276	103	1110	199	7	903 P6
Nickel	103	365	128	103	371	135	2	234 M0
Selenium	103	105	99	103	103	98	1	3.1
Silver	51.4	75.7	101	51.4	74.8	100	1	23.9
Zinc	103	1990	248	103	2090	342	5	1740 P6

Table 2-13. EPA 6020 MS/MSD Sample 012412031

Analyte	MS Sample ID: 012412031			MSD Sample ID: 012412031			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	143	152	100	143	152	100	0.3	8.3
Barium	143	408	101	143	434	119	6	263
Beryllium	143	138	96	143	138	95	0.3	0.81 JD3
Cadmium	143	155	100	143	155	100	0.02	11.4
Chromium	143	279	94	143	285	97	2	145
Copper	143	452	125	143	435	113	4	272
Lead	143	464	101	143	463	100	0.05	319
Nickel	143	208	101	143	207	100	0.5	64.1
Selenium	143	143	98	143	142	97	0.7	2.9
Silver	71.9	78.7	98	71.9	77.8	96	1	8.8
Zinc	143	1080	78	143	1110	96	2	971

Table 2-13. EPA 6020 MS/MSD Sample 012612191

Analyte	MS Sample ID: 012612191			MSD Sample ID: 012612191			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	98.5	101	95	98.5	102	96	0.5	7.2
Barium	98.5	476	225	98.5	383	130	22	255 M0, R1
Beryllium	98.5	94.8	95	98.5	96.8	97	2	0.73 JD3
Cadmium	98.5	134	99	98.5	137	102	2	36.5
Chromium	98.5	431	133	98.5	434	136	0.8	300 M0
Copper	98.5	469	114	98.5	611	256	26	357 M0, R1
Lead	98.5	613	-28	98.5	719	79	16	640 P6
Nickel	98.5	244	116	98.5	239	110	2	130
Selenium	98.5	92.6	91	98.5	92.4	91	0.1	2.6
Silver	49.2	64	102	49.2	65.6	105	2	13.8
Zinc	98.5	1400	302	98.5	1360	267	2	1100 P6

Table 2-13. EPA 6020 MS/MSD Sample 012712246

Analyte	MS Sample ID: 012712246			MSD Sample ID: 012712246			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	111	113	94	111	112	92	1	9.5
Barium	111	425	85	111	441	99	4	330
Beryllium	111	103	92	111	102	91	0.7	0.87 JD3
Cadmium	111	142	90	111	147	94	3	41.8
Chromium	111	400	90	111	461	143	14	301 M0
Copper	111	451	77	111	481	104	6	365
Lead	111	547	38	111	603	89	10	504 P6
Nickel	111	237	95	111	242	99	2	132
Selenium	111	105	92	111	109	95	4	3.4
Silver	55.4	73.1	90	55.4	73.9	91	1	23.2
Zinc	111	1380	-11	111	1470	73	7	1390 P6

Table 2-13. EPA 6020 MS/MSD Sample 013012256

Analyte	MS Sample ID: 013012256			MSD Sample ID: 013012256			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	151	149	92	151	150	92	0.7	10.2
Barium	151	411	107	151	409	105	0.5	249
Beryllium	151	141	93	151	144	94	2	1.1 JD3
Cadmium	151	151	92	151	154	94	2	11.6
Chromium	151	278	103	151	273	99	2	123
Copper	151	389	91	151	422	112	8	251
Lead	151	403	93	151	404	94	0.1	262
Nickel	151	205	98	151	197	92	4	57.3
Selenium	151	140	91	151	142	92	2	2.8 JD3
Silver	75.8	90.2	99	75.8	91.5	101	2	14.9
Zinc	151	978	102	151	1000	116	2	824

Table 2-13. EPA 6020 MS/MSD Sample 013112363

Analyte	MS Sample ID: 013112363			MSD Sample ID: 013112363			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	87.1	107	95	87.1	108	96	0.4	23.9
Barium	87.1	762	420	87.1	476	92	46	396 P6, R1
Beryllium	87.1	83.9	95	87.1	83.8	95	0.08	0.96 JD3
Cadmium	87.1	189	92	87.1	196	101	4	108
Chromium	87.1	1080	-110	87.1	1100	-85	2	1180 P6
Copper	87.1	618	77	87.1	683	152	10	551 P6
Lead	87.1	810	22	87.1	800	11	1	790 P6
Nickel	87.1	226	92	87.1	235	103	4	145
Selenium	87.1	85.9	95	87.1	86	96	0.1	2.9
Silver	43.6	63.4	101	43.6	63.6	102	0.3	19.4
Zinc	87.1	2100	-11	87.1	2190	85	4	2110 P6

Table 2-13. EPA 6020 MS/MSD Sample 020112447

Analyte	MS Sample ID: 020112447			MSD Sample ID: 020112447			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	59.9	70.4	96	59.9	70.9	96	0.7	13
Barium	59.9	112	114	59.9	108	107	4	43.9
Beryllium	59.9	56.5	93	59.9	57.2	94	1	0.78 JD3
Cadmium	59.9	58.5	97	59.9	58.5	97	0.06	0.48 JD3
Chromium	59.9	83.6	103	59.9	81.8	100	2	21.9
Copper	59.9	88.7	77	59.9	92.9	84	5	42.5
Lead	59.9	75.2	96	59.9	79	102	5	17.6
Nickel	59.9	97.2	64	59.9	100	69	3	58.9 M0
Selenium	59.9	60.5	98	59.9	59	95	2	1.8
Silver	29.9	28.9	96	29.9	29.2	97	1	0.14 JD3
Zinc	59.9	118	62	59.9	117	61	0.7	80.4 M0

Table 2-13. EPA 6020 MS/MSD Sample 020212511

Analyte	MS Sample ID: 020212511			MSD Sample ID: 020212511			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	113	123	97	113	119	93	3	13.9
Barium	113	589	125	113	503	49	16	447 P6
Beryllium	113	106	93	113	106	93	0.3	0.85 JD3
Cadmium	113	251	115	113	201	71	22	120 M0, R1
Chromium	113	765	163	113	590	8	26	581 P6, R1
Copper	113	706	118	113	581	7	20	573 P6
Lead	113	1120	143	113	882	-70	24	962 P6, R1
Nickel	113	319	106	113	291	80	9	200
Selenium	113	106	91	113	110	94	4	3.4
Silver	56.7	81.7	89	56.7	75.8	79	7	31.2
Zinc	113	2510	291	113	1910	-235	27	2180 P6, R1

Table 2-13. EPA 6020 MS/MSD Sample 020212474

Analyte	MS Sample ID: 020212474			MSD Sample ID: 020212474			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	110	113	95	110	112	95	1	8.3
Barium	110	323	95	110	295	70	9	219 M0
Beryllium	110	110	99	110	109	99	0.3	0.80 JD3
Cadmium	110	116	97	110	115	97	0.8	8.8
Chromium	110	210	90	110	214	94	2	111
Copper	110	335	93	110	324	84	3	232
Lead	110	419	45	110	433	59	3	369 M0
Nickel	110	172	97	110	161	88	7	65
Selenium	110	102	90	110	102	91	0.6	2.5
Silver	55.2	56.5	93	55.2	61.2	102	8	5.2
Zinc	110	854	89	110	780	22	9	756 P6

Table 2-13. EPA 6020 MS/MSD Sample 020312591

Analyte	MS Sample ID: 020312591			MSD Sample ID: 020312591			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Aluminum	969	16400	495	969	17400	598	6	11600 P6
Antimony	96.9	74.9	68	96.9	73.1	66	2	9.2 M0
Arsenic	96.9	124	93	96.9	128	98	3	33.3
Barium	96.9	624	123	96.9	620	119	0.7	505
Cadmium	96.9	137	96	96.9	139	99	2	43.7
Chromium	96.9	1180	-51	96.9	1200	-31	2	1230 P6
Copper	96.9	496	84	96.9	515	104	4	414
Iron	969	25400	137	969	27100	318	7	24000 P6
Lead	96.9	7140	6560	96.9	963	184	152	784 P6, R1
Manganese	96.9	367	53	96.9	383	69	4	316 M0
Nickel	96.9	193	93	96.9	197	97	2	103
Selenium	96.9	93.3	92	96.9	95.8	94	3	4.4
Silver	48.5	55.4	94	48.5	55.6	95	0.4	9.8
Vanadium	96.9	277	83	96.9	280	85	0.9	197
Zinc	96.9	1940	138	96.9	1990	186	2	1810 P6

Table 2-13. EPA 6020 MS/MSD Sample 020612657

Analyte	MS Sample ID: 020612657			MSD Sample ID: 020612657			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Aluminum	916	14900	328	916	14300	261	4	11900 P6
Antimony	91.6	62	61	91.6	61.6	61	0.8	5.8 M0
Arsenic	91.6	111	94	91.6	110	92	1	25.1
Barium	91.6	496	110	91.6	566	186	13	395 P6
Cadmium	91.6	124	103	91.6	118	96	5	30.3
Chromium	91.6	491	117	91.6	433	53	13	384 P6
Copper	91.6	470	46	91.6	466	42	0.8	427 P6
Iron	916	29200	392	916	23800	-202	21	25600 P6, R1
Lead	91.6	752	-3	91.6	780	27	4	755 P6
Manganese	91.6	432	112	91.6	390	67	10	329 M0
Nickel	91.6	169	109	91.6	151	88	12	70.1
Selenium	91.6	89.1	95	91.6	86.1	91	3	2.5
Silver	45.8	53.5	95	45.8	53.5	94	0.01	10.1
Vanadium	91.6	281	107	91.6	255	78	10	183
Zinc	91.6	1510	101	91.6	1440	20	5	1420 P6

Table 2-13. EPA 6020 MS/MSD Sample 020712722

Analyte	MS Sample ID: 020712722			MSD Sample ID: 020712722			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Chromium	86.5	342	14	86.5	408	91	18	329 M0
Copper	86.5	272	54	86.5	326	116	18	225 M0
Iron	865	27400	348	865	26400	242	3	24400 P6
Lead	86.5	544	-40	86.5	568	-12	4	579 P6
Manganese	86.5	525	90	86.5	488	48	7	447 P6
Nickel	86.5	134	88	86.5	151	109	12	57.6
Selenium	86.5	85.3	96	86.5	87.3	98	2	2.4
Silver	43.3	46.3	94	43.3	47.3	97	2	5.6
Vanadium	86.5	164	85	86.5	174	97	6	89.8
Zinc	86.5	892	-89	86.5	1110	169	22	969 P6, R1

Table 2-13. EPA 6020 MS/MSD Sample 020812776

Analyte	MS Sample ID: 020812776			MSD Sample ID: 020812776			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Aluminum	925	18000	524	925	18200	548	1	13100 P6
Antimony	92.5	60.4	61	92.5	61.7	63	2	3.6 M0
Arsenic	92.5	129	99	92.5	130	99	0.4	37.8
Barium	92.5	485	93	92.5	499	109	3	399
Cadmium	92.5	93.7	98	92.5	94.6	99	0.9	2.7
Chromium	92.5	489	106	92.5	499	116	2	391
Copper	92.5	296	102	92.5	284	89	4	201
Iron	925	26400	207	925	30700	670	15	24500 P6
Lead	92.5	848	148	92.5	794	90	7	711 P6
Manganese	92.5	521	118	92.5	564	165	8	412 P6
Nickel	92.5	121	96	92.5	122	96	0.6	32.7
Selenium	92.5	90.9	95	92.5	91.4	95	0.6	3
Silver	46.4	48.9	94	46.4	49.1	94	0.3	5.5
Vanadium	92.5	187	104	92.5	189	107	2	90
Zinc	92.5	991	161	92.5	928	93	7	842 P6

Table 2-13. EPA 6020 MS/MSD Sample 020912868

Analyte	MS Sample ID: 020912868			MSD Sample ID: 020912868			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Aluminum	600	18500	685	600	18100	618	2	14300 P6
Antimony	60	29	48	60	28.7	47	0.9	0.41 JD3, M0
Arsenic	60	69.6	97	60	71.1	99	2	11.5
Barium	60	116	117	60	116	116	0.04	46.2
Cadmium	60	59	98	60	59.6	98	1	0.16 JD3
Chromium	60	88.5	104	60	89.6	105	1	26.1
Copper	60	94.9	101	60	96.6	103	2	34.3
Iron	600	26200	116	600	27100	267	3	25500 P6
Lead	60	81.6	99	60	82.8	101	1	22.1
Manganese	60	469	127	60	496	172	6	392 P6
Nickel	60	96.2	95	60	97.3	96	1	39.5
Selenium	60	61.3	99	60	62.1	100	1	2
Silver	30.1	29.1	97	30.1	29.6	98	2	0.095 JD3
Vanadium	60	96.4	108	60	96.6	107	0.2	31.7
Zinc	60	119	102	60	125	110	4	57.9

Table 2-13. EPA 6020 MS/MSD Sample 021012887

Analyte	MS Sample ID: 021012887			MSD Sample ID: 021012887			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Aluminum	1110	20100	518	1110	19200	441	4	14300 P6
Antimony	111	66.7	56	111	65.8	55	1	4.6 M0
Arsenic	111	123	94	111	125	96	1	19.1
Barium	111	661	96	111	676	110	2	554
Cadmium	111	180	92	111	182	94	1	78.1
Chromium	111	966	96	111	970	100	0.4	859
Copper	111	707	102	111	718	112	1	595
Iron	1110	28900	205	1110	28700	187	0.8	26700 P6
Lead	111	1040	83	111	1070	109	3	949
Manganese	111	429	101	111	432	105	0.7	316
Nickel	111	270	95	111	266	92	2	164
Selenium	111	106	91	111	107	93	1	4.5
Silver	55.6	74.2	95	55.6	73	93	2	21.8
Vanadium	111	577	97	111	577	97	0.02	469
Zinc	111	3170	167	111	3200	197	1	2990 P6

Table 2-13. EPA 6020 MS/MSD Sample 021312921

Analyte	MS Sample ID: 021312921			MSD Sample ID: 021312921			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Aluminum	1200	19100	383	1200	19600	419	2	14500 P6
Antimony	120	79.2	64	120	79.4	64	0.3	2.7 M0
Arsenic	120	126	97	120	126	97	0.2	9.6
Barium	120	474	91	120	495	108	4	365
Beryllium	120	117	97	120	119	98	1	
Cadmium	120	158	98	120	161	100	2	40.4
Chromium	120	472	101	120	472	101	0.06	351
Copper	120	547	67	120	590	102	8	467 M0
Iron	1200	25000	146	1200	24900	142	0.2	23200 P6
Lead	120	687	27	120	704	42	3	654 P6
Manganese	120	429	96	120	437	103	2	313
Nickel	120	355	116	120	338	101	5	216
Selenium	120	116	94	120	118	95	1	3.7
Silver	60	81.8	101	60	83	102	1	21.4
Vanadium	120	211	104	120	211	104	0.04	85.8
Zinc	120	1640	-34	120	1690	3	3	1680 P6

Table 2-13. EPA 6020 MS/MSD Sample 021312946

Analyte	MS Sample ID: 021312946			MSD Sample ID: 021312946			RPD	Lab Sample Result (mg/Kg)
	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)		
Arsenic	62.3	69.4	96	62.3	69.4	96	0.1	9.4
Barium	62.3	113	93	62.3	133	127	17	54.7 M0
Beryllium	62.3	57.8	91	62.3	60.8	96	5	0.86 JD3
Cadmium	62.3	58.5	92	62.3	60	95	2	1.1 JD3
Chromium	62.3	93.3	87	62.3	102	101	9	39
Copper	62.3	86.3	83	62.3	88.6	87	3	34.6
Lead	62.3	83.6	87	62.3	149	193	56	29.1 M0, R1
Nickel	62.3	91.6	91	62.3	91.5	91	0.1	34.7
Selenium	62.3	62.4	98	62.3	62.5	98	0.2	1.5
Silver	31.2	28.1	89	31.2	28.5	91	1	0.31 JD3
Zinc	62.3	131	54	62.3	145	78	11	96.9 M0

Table 2-13. EPA 6020 MS/MSD Sample 012312016

Analyte	MS Sample ID: 012312016			MSD Sample ID: 012312016			RPD	Lab Sample Result (µg/L)
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)		
Arsenic	500	503	100	500	503	101	0.1	0.55 J
Barium	500	500	99	500	502	99	0.5	5.6
Beryllium	500	498	99	500	505	101	2	1.0 U
Cadmium	500	501	100	500	500	100	0.06	0.34 J
Chromium	500	497	98	500	500	99	0.5	5.5
Copper	500	510	101	500	509	101	0.2	3.4
Lead	500	497	99	500	496	99	0.2	2.8
Nickel	500	506	101	500	506	101	0.04	1.7
Selenium	500	505	101	500	503	101	0.2	1.0 U
Silver	250	250	100	250	248	99	0.6	0.19 J
Zinc	500	508	100	500	509	100	0.2	8.2 J

Table 2-13. EPA 6020 MS/MSD Sample 013012255

Analyte	MS Sample ID: 013012255			MSD Sample ID: 013012255			RPD	Lab Sample Result (µg/L)
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)		
Arsenic	500	489	98	500	492	98	0.6	1.0 U
Barium	500	473	95	500	479	96	1	0.55 J
Beryllium	500	505	101	500	508	102	0.7	1.0 U
Cadmium	500	487	97	500	492	98	1	1.0 U
Chromium	500	481	96	500	483	96	0.5	1.5
Copper	500	482	96	500	487	97	0.9	0.94 J
Lead	500	478	95	500	481	96	0.5	0.92 J
Nickel	500	494	99	500	496	99	0.5	0.50 J
Selenium	500	499	100	500	501	100	0.4	1.0 U
Silver	250	242	97	250	245	98	2	0.50 U
Zinc	500	485	96	500	490	97	0.9	4.5 J

Table 2-13. EPA 6020 MS/MSD Sample 020812724

Analyte	MS Sample ID: 020812724			MSD Sample ID: 020812724			RPD	Lab Sample Result (µg/L)
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)		
Aluminum	5000	5320	94	5000	5290	94	0.5	607
Antimony	500	488	98	500	492	98	0.7	0.30 J
Arsenic	500	478	95	500	480	96	0.4	0.85 J
Barium	500	498	94	500	499	94	0.1	27
Cadmium	500	495	98	500	498	99	0.6	2.6
Chromium	500	490	94	500	494	94	0.8	22.2
Copper	500	473	91	500	474	91	0.2	16.7
Iron	5000	6010	95	5000	6000	95	0.2	1270
Lead	500	540	96	500	542	96	0.3	61.9
Manganese	500	491	94	500	492	94	0.2	21.7
Nickel	500	476	94	500	479	94	0.5	8.3
Selenium	500	495	99	500	499	100	0.8	1.0 U
Silver	250	240	96	250	240	96	0.04	0.44 J
Vanadium	500	483	96	500	489	97	1	5
Zinc	500	572	96	500	575	97	0.6	92

Table 2-14. Mercury MS/MSD Recoveries

Sample ID	Analyte	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)	RPD	Lab Sample Result (µg/L)
012412034	Mercury	5	4.9	98	5	4.7	93	6	0.20 U
020612611	Mercury	5	5.5	108	5	4.8	94	13	0.20 U
020912771	Mercury	5	4.3	87	5	4.5	90	4	0.20 U
021312869	Mercury	5	5.2	104	5	5.2	104	0.04	0.20 U
012412078	Mercury	0.35	2.1	14	0.35	2.6	168	22	2.0 P6, R1
012412031	Mercury	0.49	3.8	554	0.49	2.3	243	49	1.1 P6, R1
012612191	Mercury	0.32	2.8	261	0.32	5.1	976	60	1.9 M0, R1
012512137	Mercury	0.47	1.4	117	0.47	2.9	449	72	0.82 M0, R1
012712246	Mercury	0.38	1.9	123	0.38	2.3	234	19	1.5 M0
013012256	Mercury	0.52	1.9	105	0.52	1.9	102	1	1.4
013112363	Mercury	0.28	3.5	183	0.28	3	-0.7	16	3.0 P6
020112447	Mercury	0.21	0.23	104	0.21	0.23	102	2	0.027
020212511	Mercury	0.39	5	300	0.39	5.8	514	15	3.9 P6
020212474	Mercury	0.38	1.6	-133	0.38	3.4	358	72	2.1 P6, R1
020312591	Mercury	0.31	12.5	940	0.31	9.7	95	24	9.4 P6, R1
020612657	Mercury	0.31	7.4	-135	0.31	7.4	-123	0.5	7.8 P6
020712722	Mercury	0.3	8.4	-547	0.3	10.3	129	21	9.9 P6, R1
020812776	Mercury	0.3	7.9	484	0.3	7.5	348	5	6.4 P6
020912868	Mercury	0.21	0.35	161	0.21	0.48	228	69	0.025 M0, R1
021012887	Mercury	0.38	4.3	-26	0.38	4.1	-72	4	4.4 P6
021312921	Mercury	0.41	2.9	212	0.41	2.3	84	20	2.0 P6
021312946	Mercury	0.21	0.35	79	0.21	0.33	69	6	0.19 M0

Table 2-15. Cyanide MS/MSD Recoveries

Method	Sample ID	Analyte	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Spike (mg/Kg)	MSD Result (mg/Kg)	Recovery (%)	RPD	Lab Sample Result (mg/Kg)
EPA 9012	012412078	Cyanide	2.7	6.3	48	2.7	5.5	15	15	5.0 M0
EPA 9012	012412031	Cyanide	2.7	2.8	50	2.7	3.2	54	13	1.4 M0
EPA 9012	012612191	Cyanide	2.4	3.8	44	2.4	3.6	37	6	2.7 M0
EPA 9012	012712246	Cyanide	7.4	6	64	7.4	3.9	46	42	1.2 JM0, R1
EPA 9012	013112363	Cyanide	5.7	10.9	60	5.7	10.1	46	8	7.4 M0
EPA 9012	020212511	Cyanide	7.3	13.4	101	7.3	23.5	216	55	6.1 M0, R1
EPA 9012	020112447	Cyanide	2.8	2.1	76	2.8	2.9	82	28	0.47 UM0, R1
EPA 9012	020212474	Cyanide	13.3	9.2	63	13.3	7.2	48	25	2.7 UM0, R1
EPA 9012	020312591	Cyanide	9.7	11.3	89	9.7	9.4	75	19	2.7 M0
EPA 9012	020612657	Cyanide	9.2	6.8	61	9.2	7.7	71	13	1.2 JM0
EPA 9012	020712722	Cyanide	5.7	8	87	5.7	16	226	67	2.9 M0, R1
EPA 9012	020812776	Cyanide	5.6	5.8	82	5.6	4	50	36	1.2 M0, R1
EPA 9012	020912868	Cyanide	3	2.2	70	3	2.5	82	16	0.60 UM0
EPA 9012	021312921	Cyanide	6.3	10.7	113	6.3	9	86	17	3.6
EPA 9012	021012887	Cyanide	6.7	18.4	129	6.7	11.4	24	47	9.8 M0, R1
EPA 9012	021312946	Cyanide	2.1	1.6	74	2.1	1.9	85	14	0.43 UM0
EPA 9012	020112334	Cyanide	0.1	0.08	78	0.1	0.072	70	9	0.020 U1q, M0
EPA 335.4	012712150	Cyanide	0.1	0.096	93	0.1	0.096	92	0.4	0.020 U
EPA 335.5	021012811	Cyanide	0.1	0.1	103	0.1	0.1	101	2	0.020 U

Table 2-16. Total Organic Carbon MS/MSD Recoveries

Analyte	Sample ID	Spike (mg/Kg)	MS Result (mg/Kg)	Recovery (%)	Lab Sample Result (mg/Kg)
Total Organic Carbon	012412031	44100	137800	101	93400
	012412078	43200	146400	111	98600
	012612191	38800	130500	95	93700
	012712246	35000	176500 F	216	101000
	013112363	34400	76040	97	42700
	020112447	38500	84210	104	44400
	020212474	51400	162000	101	110000
	020212511	42400	152700	100	110000
	020312591	48500	162800 F	72	128000
	020712722	38000	153000	96	117000 ^
	020812776	36900	144500	89	112000
	020912868	34200	66470	102	31600
	021012887	32300	175600 4	100	143000
	021312921	36800	138900	80	109000
	021312946	44100	80960	102	36100

Table 2-17. Field Duplicates Total Metals

Analyte	Sample ID: 012412017		Sample ID: 012412018		RPD	Sample ID: 012512087		Sample ID: 012512088		RPD	Sample ID: 012712225		Sample ID: 012712239		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Arsenic	8.0		7.3		9	8.1		7.5		8	19.9		17.9		11
Barium	315		254		21	271		266		2	468		340		32
Beryllium	0.74	JD3	0.64	JD3	14	0.66	JD3	0.73	JD3	10	0.73	JD3	0.75	JD3	3
Cadmium	10.9		10.3		6	10.7		23.2		74	147		131		12
Chromium	127		124		2	127		130		2	774		779		1
Copper	272		269		1	278		273		2	501		516		3
Lead	281		272		3	281		284		1	839		924		10
Nickel	54.5		54.6		0	61.6		57.0		8	179		217		19
Selenium	3.1		3.1		0	2.9		2.6		11	2.5		2.2		13
Silver	10.2		13.2		26	10.5		10.8		3	19.4		19.7		2
Zinc	923		898		3	923		896		3	1830		1780		3

Table 2-17. Field Duplicates Total Metals Continued 1

Analyte	Sample ID: 013012257		Sample ID: 013012258		RPD	Sample ID: 013012302		Sample ID: 013012303		RPD	Sample ID: 020112436		Sample ID: 020112437		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Arsenic	8.7		8.7		0	9.7		10.0		3	8.6		8.0		7
Barium	270		278		3	323		316		2	261		268		3
Beryllium	1.1	JD3	0.88	JD3	22	0.95	JD3	1.0	JD3	5	0.78	JD3	0.66	JD3	17
Cadmium	15.0		15.4		3	50.7		51.1		1	10.1		11.2		10
Chromium	142		147		3	291		288		1	118		122		3
Copper	254		261		3	383		385		1	278		295		6
Lead	253		272		7	421		437		4	279		294		5
Nickel	57.5		60.0		4	150		148		1	55.3		56.6		2
Selenium	3.1		2.7		14	2.8		2.6		7	2.9		3.3		13
Silver	19.0		20.5		8	23.4		23.2		1	10.3		11.0		7
Zinc	907		933		3	1430		1400		2	862		899		4

Table 2-17. Field Duplicates Total Metals Continued 2

Analyte	Sample ID: 021312949		Sample ID: 021312963		RPD	Sample ID: 020112469		Sample ID: 020112471		RPD	Sample ID: 020212541		Sample ID: 020212558		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Flag	
Arsenic	8.0		7.7		4	9.1		8.7		4	38.5		40.3		5
Barium	252		245		3	351		352		0	497		819		49
Beryllium	0.77	JD3	0.63	JD3	20	0.73	JD3	0.62	JD3	16	0.89	JD3	0.80	JD3	11
Cadmium	9.4		8.9		5	42.0		43.9		4	56.5		55.9		1
Chromium	120		117		3	304		307		1	1030		1060		3
Copper	298		243		20	426		428		0	415		422		2
Lead	351		278		23	463		459		1	750		781		4
Nickel	53.9		52.0		4	184		179		3	85.8		83.7		2
Selenium	2.8		2.9		4	3.0		3.3		10	3.5		3.4		3
Silver	7.3		9.4		25	26.1		27.1		4	10.0		9.7		3
Zinc	916		876		4	1320		1350		2	1750		1830		4

Table 2-17. Field Duplicates Total Metals Continued 3

Analyte	Sample ID: 020312569		Sample ID: 020312576		RPD	Sample ID: 020612639		Sample ID: 020612641		RPD	Sample ID: 020712694		Sample ID: 020712706		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Aluminum	12500		12900		3	11100		10300		7	9810		10500		7
Antimony	3.9		4.6		16	3.8		2.4		45	3.4		3.1		9
Arsenic	23.9		23.9		0	26.5		20.3		26	11.9		12.6		6
Barium	342		350		2	409		250		48	431		487		12
Cadmium	5.9		13.0		75	17.9		12.3		37	143		160		11
Chromium	258		300		15	337		217		43	710		789		11
Copper	377		457		19	432		238		58	591		685		15
Iron	26400		25100		5	27500		26000		6	25000		24300		3
Lead	644		641		0	719		418		53	942		1030		9
Manganese	370		351		5	340		361		6	398		396		1
Nickel	45.2		59.2		27	86.9		63.6		31	264		272		3
Selenium	2.8		3.4		19	2.9		2.0		37	2.4		2.5		4
Silver	9.8		10.9		11	12.8		6.4		67	24.9		27.0		8
Vanadium	61.5		68.6		11	162		108		40	165		184		11
Zinc	1110		1300		16	1940		1060		59	2460		2750		11

Table 2-17. Field Duplicates Total Metals Continued 4

Analyte	Sample ID: 020812764		Sample ID: 020812770		RPD	Sample ID: 020912823		Sample ID: 020912824		RPD	Sample ID: 021012882		Sample ID: 021012883		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Aluminum	4940		4700		5	13200		13300		1	14100		15000		6
Antimony	1.8		1.6		12	4.9		4.1		18	0.22	JD3	0.17	UD3	26
Arsenic	9.6		10.7		11	38.2		37.2		3	10.8		10.2		6
Barium	138		185		29	457		434		5	58.0		53.2		9
Cadmium	9.1		8.4		8	2.6		3.0		14	0.34	JD3	0.15	JD3	78
Chromium	125		126		1	492		448		9	27.1		25.2		7
Copper	127		142		11	381		355		7	32.7		29.5		10
Iron	14300		13300		7	26400		26600		1	25400		26400		4
Lead	273		254		7	732		707		3	43.3		17.2		86
Manganese	189		190		1	381		396		4	426		407		5
Nickel	34.6		38.1		10	36.8		38.6		5	33.4		34.5		3
Selenium	1.3		1.4		7	2.5		2.7		8	1.5		1.5		0
Silver	3.3		3.7		11	7.3		7.2		1	0.12	JD3	0.055	JD3	74
Vanadium	33.3		34.3		3	105		99.2		6	27.3		27.0		1
Zinc	491		543		10	1060		1090		3	73.7		62.7		16

Table 2-17. Field Duplicates Total Metals Continued 5

Analyte	Sample ID: 021012898		Sample ID: 021012901		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Aluminum	11400		12400		8
Antimony	4.1		4.8		16
Arsenic	22.5		21.8		3
Barium	377		473		23
Cadmium	65.4		84.0		25
Chromium	572		757		28
Copper	387		447		14
Iron	24800		25000		1
Lead	636		819		25
Manganese	258		269		4
Nickel	106		122		14
Selenium	3.2		3.5		9
Silver	11.0		14.5		27
Vanadium	314		414		27
Zinc	1560		1960		23

Table 2-18. Field Duplicates Other Inorganics

Analyte	Sample ID: 012412017		Sample ID: 012412018		RPD	Sample ID: 012512087		Sample ID: 012512088		RPD	Sample ID: 012712225		Sample ID: 012712239		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Mercury	2.0		1.1		58	1.1		1.1		0	2.6		2.6		0
Cyanide	0.83	J	0.79	J	5	1.1	J	1.1		0	5.0		5.0		0
Black Carbon	31600		32400		3						34900		35200		1
Total Organic Carbon	93400		93100		0	96900		90500		7	123000		117000		5
Percent Moisture	63.2		63.5		0	61.6		59.2		4	44.2		42.8		3

Table 2-18. Field Duplicates Other Inorganics Continued 1

Analyte	Sample ID: 013012257		Sample ID: 013012258		RPD	Sample ID: 013012302		Sample ID: 013012303		RPD	Sample ID: 020112436		Sample ID: 020112437		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Mercury	1.4		1.4		0	2.3		1.5		42	2.0		1.5		29
Cyanide	0.80	U	0.73	U	0	3.6		2.4		40	1.1	JM0, R1	0.90	J	20
Black Carbon						27100	^	29600	^	9					
Total Organic Carbon	85400		84700		1	92200		94100		2	93700		96100		3
Percent Moisture	62.6		63.7		2	59.3		59.6		1	56.1		57.0		2

Table 2-18. Field Duplicates Other Inorganics Continued 2

Analyte	Sample ID: 020112469		Sample ID: 020112471		RPD	Sample ID: 020212541		Sample ID: 020212558		RPD	Sample ID: 020312569		Sample ID: 020312576		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Mercury	1.9		2.8		38	10.0		8.0		22	6.5		7.4		13
Cyanide	2.8		3.0		7	3.4		2.4		34	1.6		1.3		21
Black Carbon						33500		37900		12	34600		31200		10
Total Organic Carbon	100000		98200		2	123000		134000		9	98300		103000		5
Percent Moisture	58.8		58.6		0	48.8		46.4		5	45.9		48.1		5

Table 2-18. Field Duplicates Other Inorganics Continued 3

Analyte	Sample ID: 020612639		Sample ID: 020612641		RPD	Sample ID: 020712694		Sample ID: 020712706		RPD	Sample ID: 020812764		Sample ID: 020812770		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Mercury	11.7		9.9		17	3.8		4.6		19	4.5		6.1		30
Cyanide	1.8		1.8		0	48.4		17.5		94	1.1		1.2		9
Total Organic Carbon	137000		135000		1	120000 ^		121000 ^		1	82100		80400		2
Percent Moisture	45.6		33.8		30	48.9		51.2		5	22.8		26.1		13

Table 2-18. Field Duplicates Other Inorganics Continued 4

Analyte	Sample ID: 020912823		Sample ID: 020912824		RPD	Sample ID: 021012882		Sample ID: 021012883		RPD	Sample ID: 021012898		Sample ID: 021012901		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag		Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Mercury	5.8		4.5		25	0.036		0.057		45	3.7		4.6		22
Cyanide	0.64	J	1.3		68	0.24	U	0.20	U	0	3.0		5.7		62
Black Carbon											36600	B ^	44500	B ^	19
Total Organic Carbon	109000	B	98100	B	11	43600		37400		15	142000		129000		10
Percent Moisture	46.2		46.4		0	16.7		15.7		6	41.5		49.9		18

Table 2-18. Field Duplicates Other Inorganics Continued 5

Analyte	Sample ID: 021312949		Sample ID: 021312963		RPD
	Result (mg/Kg)	Lab Flag	Result (mg/Kg)	Lab Flag	
Mercury	1.5		1.1		31
Cyanide	0.80	U	0.88	J	NC
Total Organic Carbon	95400		88700		7
Percent Moisture	60.9		62.0		2

Table 3-1. Organic Analytes and Methods Summary

Analytical Method	Analyte
Alkylated PAH by SIM	Alkylated PAHs
EPA 8082	PCBs
EPA 8260	Purgeable Volatile Organic Compounds (PVOC)
EPA 8270	Semivolatile Organic Compounds (SVOC)
EPA 8270 by SIM	Polycyclic Aromatic Hydrocarbons (PAH)

Table 3-2. Method 8260 Method Blank Analytical Results Summary Water Samples (µg/L)

Analyte	QC Batch: 90807	QC Batch: 91005	QC Batch: 91322	QC Batch: 91516	QC Batch: 91731	QC Batch: 92116
1,2,4-Trimethylbenzene	1.0 U					
1,3,5-Trimethylbenzene	1.0 U					
Benzene	1.0 U					
Ethylbenzene	1.0 U					
Toluene	1.0 U					
Xylene (Total)	3.0 U					

Table 3-2. Method 8260 Method Blank Analytical Results Summary Soil Samples (µg/Kg)

Analyte	QC Batch: 90776	QC Batch: 90808	QC Batch: 91044	QC Batch: 91045	QC Batch: 91174	QC Batch: 91265	QC Batch: 91388	QC Batch: 91390	QC Batch: 91475
1,2,4-Trimethylbenzene	50.0 U								
1,3,5-Trimethylbenzene	50.0 U								
Benzene	20.0 U								
Ethylbenzene	25.0 U								
Toluene	50.0 U								
Xylene (Total)	75.0 U								

**Table 3-2. Method 8260 Method Blank Analytical Results Summary Continued
Soil Samples (µg/Kg)**

Analyte	QC Batch: 91554	QC Batch: 91702	QC Batch: 91779	QC Batch: 91874	QC Batch: 91948	QC Batch: 92000	QC Batch: 92179	QC Batch: 92239	QC Batch: 92376
1,2,4-Trimethylbenzene	50.0 U								
1,3,5-Trimethylbenzene	50.0 U								
Benzene	20.0 U								
Ethylbenzene	25.0 U								
Toluene	50.0 U								
Xylene (Total)	75.0 U								

Table 3-3. Surrogate Compound Recovery Data for Method 8260

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056201001	012312001	50	58	55
4056201002	012312002	53	62	58
4056201003	012312006	54	61	57
4056201004	012312009	56	63	57
4056201005	012312010	66	70	67
4056201006	012312012	88	99	93
4056201007	012312016	77	88	76
4056273001	012412034	82	87	83
4056273002	012412083	78	86	82
4056273003	012412084	79	86	79
4056273005	TRIP 012712	79	86	83
4056282001	012412017	47	60	53 S2
4056282002	012412018	48	61	55
4056282003	012412019	55	66	61
4056282004	012412020	49	59	55
4056282005	012412025	58	68	62
4056282006	012412026	59	70	64
4056282007	012412028	53	65	59
4056282008	012412029	89	94	97
4056282009	012412031	59	66	64
4056282010	012412032	51	63	61
4056282011	012412033	51	60	57
4056282012	012412049	50	60	57
4056282013	012412050	53	63	58
4056282014	012412051	51	57	57
4056282015	012412066	52	58	57
4056282016	012412067	48	57	55
4056282017	012412068	53	62	58

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056282018	012412069	51	63	59
4056282019	012412078	55	64	57
4056282020	012412079	56	73	63
4056282021	012412081	90	94	93
4056282022	012512085	59	62	60
4056282023	012512086	51	59	55
4056282024	012512087	50	58	55
4056282025	012512088	55	62	56
4056282026	012512103	54	61	57
4056282027	012512104	51	62	57
4056282028	012512105	50	59	55
4056282029	012512120	59	66	62
4056282030	012512121	54	60	54 S2
4056282031	012512122	52	64	56
4056282032	012512124	55	64	61
4056308001	012512137	48	61	53 S2
4056308002	012512138	52	65	59
4056308003	012512139	63	75	72
4056308004	012512147	64	79	71
4056308005	012512149	89	98	97
4056308006	012612151	81	92	88
4056308007	012612152	58	71	64
4056308008	012612153	63	76	69
4056308009	012612160	58	69	65
4056309001	012612161	57	70	64
4056309002	012612162	60	70	67
4056309003	012612163	53	66	58
4056309004	012612164	51	69	60
4056309005	012612165	65	74	67
4056309006	012612176	50	64	60

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056309007	012612177	58	70	63
4056309008	012612178	53	66	60
4056309009	012612187	61	78	71
4056309010	012612188	96	107	101
4056309011	012612189	52	65	58
4056309012	012612190	54	65	59
4056309013	012612191	63	72	65
4056309014	012712204	51	62	59
4056309015	012712205	57	69	63
4056309016	012712206	61	72	67
4056364001	013012280	63	71	67
4056364002	013012284	75	84	75
4056364003	013012285	87	99	94
4056364004	013012302	59	70	65
4056364005	013012303	59	72	65
4056364006	013012304	57	70	62
4056364007	013012305	62	75	68
4056364008	013012318	54	68	59
4056364009	013012319	67	82	71
4056364010	013012320	65	79	71
4056364011	013012330	0 S4	0 D3, S4	0 S4
4056364012	013012331	0 S4	0 D3, S4	0 S4
4056365001	013012255	81	87	83
4056365002	013112333	80	84	83
4056365003	020112334	81	87	82
4056365004	TRIP020112	79	86	83
4056369001	012712217	57	67	62
4056369002	012712218	67	75	73
4056369003	012712219	61	69	64
4056369004	012712225	82	91	83

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056369005	012712239	77	89	80
4056369006	012712226	87	93 D3	90
4056369007	012712228	53	65	59
4056369008	012712229	60	69	64
4056369009	012712230	61	75	66
4056369010	012712231	59	69	66
4056369011	012712236	65	77 D3	72
4056369012	012712240	67	74	72
4056369013	012712241	70	76	70
4056369014	012712242	65	72	67
4056369015	012712246	65	73	65
4056369016	012712252	0 S4	0 D3, S4	0 S4
4056369017	012712253	0 S4	0 D3, S4	0 S4
4056370001	013012256	57	66	62
4056370002	013012257	56	74	64
4056370003	013012258	57	73	68
4056370004	013012259	55	66	63
4056370005	013012287	61	70	69
4056370006	013012288	54	73	65
4056370007	013012289	74	87	80
4056370008	013012295	65	82	75
4056370009	013012299	79	85	82
4056370010	013012300	92	95	93
4056370011	013012272	56	67	64
4056370012	013012273	66	84	73
4056370013	013012274	68	81	78
4056464001	020212472	79	84	79
4056464002	020312491	80	83	80
4056464003	TRIP020312	80	82	79
4056465001	020112450	52	66	59

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056465002	020112451	62	71	68
4056465003	020112452	65	77	72
4056465004	020112465	90	95	91
4056465005	020112466	77	90	84
4056465006	020112467	49	66	60
4056465007	020112468	65	76	72
4056465008	020112469	59	75	69
4056465009	020112471	54	65	62
4056466001	013112397	51	63	59
4056466002	013112398	56	71	62
4056466003	013112399	71	82	78
4056466004	013112412	98	102	105
4056466005	013112413	94	103	99
4056466006	020112414	47	61	58
4056466007	020112415	49	58	55
4056466008	020112416	59	68	66
4056466009	020112417	56	69	62
4056466010	020112418	52	64	59
4056466011	020112419	53	66	60
4056466012	020112420	65	77	72
4056467001	013112335	57	68	61
4056467002	013112336	54	67	63
4056467003	013112337	50	69	59
4056467004	013112350	56	63	63
4056467005	013112351	53	66	62
4056467006	013112352	60	73	68
4056467007	013112363	91	95	95
4056467008	013112364	96	101	101
4056467009	013112365	64	70	67
4056467010	013112366	47	62	55

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056467011	013112367	57	71	64
4056467012	013112382	54	68	60
4056467013	013112383	60	75	68
4056467014	013112384	68	81	74
4056468001	020112433	56	66	62
4056468002	020112434	56	69	63
4056468003	020112435	59	71	66
4056468004	020112436	62	74	70
4056468005	020112437	62	73	69
4056468006	020112438	53	66	58
4056468007	020112439	52	64	59
4056468008	020112440	55	65	64
4056468009	020112473	0 S4	0 D3, S4	0 S4
4056468010	020112442	0 S4	0 D3, S4	0 S4
4056468011	020112445	0 S4	0 D3, S4	0 S4
4056468012	020112447	72	90 D3	95
4056552001	020212474	56	65	65
4056552002	020212475	59	65	66
4056552003	020212476	58	66	66
4056552004	020212482	68	80	75
4056552005	020212490	80	90	86
4056552006	020212492	58	71	65
4056552007	020212493	50	61	59
4056552008	020212494	62	71	69
4056552009	020212509	60	66	66
4056552010	020212510	60	69	67
4056552011	020212511	72	86	76
4056552012	020212526	64	74	70
4056552013	020212527	60	69	65
4056553001	020212528	50	66	60

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056553002	020212540	71	83	75
4056553003	020212541	70	79	74
4056553004	020212558	65	78	72
4056553005	020212542	99	97	98
4056553006	020212543	55	67	60
4056553007	020212544	59	70	64
4056553008	020212545	71	79	77
4056631001	020312559	53	60	60
4056631002	020312560	55	62	61
4056631003	020312561	62	70	70
4056631004	020312568	65	80	72
4056631005	020312569	73	80	77
4056631006	020312576	77	81	80
4056631007	020312575	78	86 D3	84
4056631008	020312577	54	65	61
4056631009	020312578	61	71	67
4056631010	020312579	53	64	60
4056631011	020312587	68	76	73
4056631012	020312591	73	82	79
4056631013	020312592	97	98	99
4056631014	020312594	64	64	67
4056631015	020312595	59	69	66
4056631016	020312596	70	75	74
4056631017	020312608	77	88	84
4056631018	020312609	67	76	73
4056631019	020312612	67	71	76
4056631020	020312613	57	70	65
4056631021	020312614	55	74	60
4056631022	020312627	0 S4	0 D3, S4	0 S4
4056631023	020312628	0 S4	0 D3, S4	0 S4

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056631024	020612629	78	77	82
4056631025	020612630	68	78	73
4056631026	020612631	82	92	88
4056631027	020612639	84	81 D3	81
4056631028	020612641	64	79 D3	77
4056631029	020612640	86	92 D3	94
4056631030	020612643	86	89	93
4056631031	020612644	104	107	110
4056631032	020612645	102	106	108
4056631033	020612657	74	86	81
4056631034	020612658	68	83 D3	85
4056631035	020612659	54	62	62
4056631036	020612660	66	74	74
4056631037	020612661	68	77	79
4056631038	020612662	72	80	77
4056631039	020612674	0 S4	0 D3, S4	0 S4
4056631040	020612675	0 S4	0 D3, S4	0 S4
4056631041	020612676	56	60	61
4056631042	020612677	71	85	80
4056631043	020612678	71	81	79
4056631044	020612683	80	88	85
4056631045	020612691	0 S4	0 S4	0 S4
4056639001	020612611	84	83	81
4056639002	020712642	82	80	76
4056693001	020712693	58	61	62
4056693002	020712694	61	69	68
4056693003	020712706	72	80	76
4056693004	020712703	0 S4	0 D3, S4	0 S4
4056693005	020712704	0 S4	0 D3, S4	0 S4
4056693006	020712705	90	93	92

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056693007	020712707	76	75	81
4056693008	020712708	61	75	67
4056693009	020712709	66	70	70
4056693010	020712722	0 S4	0 D3, S4	0 S4
4056693011	020712723	0 S4	0 D3, S4	0 S4
4056725001	020812724	90	99	99
4056725002	020912771	90	100	100
4056725003	TRIP020912	91	98	100
4056725004	021012811	91	101	99
4056730001	020712725	59	65	61
4056730002	020712726	60	65	62
4056730003	020712727	59	71	68
4056730004	020712739	75	84	81
4056730005	020712740	69	81 D3	81
4056730006	020712741	67	73	70
4056730007	020712742	70	77	75
4056730008	020712743	73	82	81
4056730009	020712751	75	85	80
4056730010	020712755	70	79	78
4056730011	020812759	62	69	65
4056730012	020812760	60	70	67
4056730013	020812761	89	91	90
4056730014	020812764	91	90	93
4056730015	020812770	90	96	93
4056730016	020812765	0 S4	0 D3, S4	0 S4
4056730017	020812769	91	98	96
4056730018	020812772	76	80	82
4056730019	020812773	0 S4	0 D3, S4	0 S4
4056730020	020812776	0 S4	0 D3, S4	0 S4
4056730021	020812777	97	100	99

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056730022	020812779	64	65	67
4056730023	020812780	62	62	64
4056730024	020812781	62	72	68
4056730025	020812790	0 S4	0 D3, S4	0 S4
4056730026	020812791	85	82 D3	96
4056730027	020812794	58	65	64
4056730028	020812795	56	65	61
4056730029	020812796	62	69	65
4056730030	020812808	80	94 D3	95
4056730031	020812809	0 S4	0 D3, S4	0 S4
4056766001	020912812	78	87	83
4056766002	020912813	80	90	89
4056766003	020912814	81	80	81
4056766004	020912822	77	80	80
4056766005	020912823	75	83	81
4056766006	020912824	76	81	80
4056766007	020912825	100	104	102
4056766008	020912826	76	80	80
4056766009	020912827	73	83	81
4056766010	020912835	70	81	75
4056766011	020912841	94	96	95
4056766012	020912842	85	90	87
4056766013	020912843	86	88	93
4056766014	020912844	70	76	76
4056766015	020912854	79	84	82
4056766016	020912855	70	76	74
4056766017	020912858	77	84	82
4056766018	020912861	75	86	81
4056766019	020912868	100	102	99
4056894001	021312869	92	99	102

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056894002	TRIP 021512	89	100	101
4056898001	021012870	82	85	86
4056898002	021012871	75	82	82
4056898003	021012873	114	116	112
4056898004	021012882	92	99	97
4056898005	021012883	92	95	97
4056898006	021012884	71	80	75
4056898007	021012885	60	82	72
4056898008	021012886	60	76	71
4056898009	021012887	69	82	75
4056898010	021012888	93	97	99
4056898011	021012889	79	80	81
4056898012	021012890	72	83	81
4056898013	021012898	70	78	77
4056898014	021012901	75	90	81
4056898015	021012899	90	97	91
4056898016	021012902	112	110	115
4056898017	021012903	63	80	73
4056898018	021012904	64	83	75
4056898019	021012905	63	79	73
4056898020	021012918	85	86	88
4056898021	021012919	71	75	72
4056898022	021012915	75	93 D3	91
4056898023	021012916	95	102	100
4056898024	021312920	62	68	68
4056898025	021312921	61	76	67
4056898026	021312922	66	74	68
4056898027	021312929	74	78	78
4056898028	021312933	97	98	98
4056898029	021312934	103	107	109

Lab Sample Number	Field ID	4-Bromofluorobenzene	Dibromofluoromethane	Toluene- <i>d</i> ₈
4056898030	021312935	65	72	69
4056898031	021312936	60	70	65
4056898032	021312937	74	79	76
4056898033	021312945	84	83 D3	90
4056898034	021312946	104	99	101
4056898035	021312948	52	62	58
4056898036	021312949	54	61	60
4056898037	021312963	58	65	64
4056898038	021312950	64	71	68
4056898039	021312958	76	81	78
4056898040	021312960	83	88	85
4056898041	021312961	166 S3	170 S3	164 S3
4056898042	021312964	56	59	60
4056898043	021312965	57	63	59
4056898044	021312966	66	74	70
4056898045	021312971	71	78	74
4056898046	021312972	67	75	73
4056898047	021312973	100	101	103
4056898048	021312975	52	63	59
4056898049	021312976	57	65	62
4056898050	021312977	63	74	70
4056898051	021312981	69	74	75
4056898052	021312985	81	86	84
4056898053	021312987	77	83	79
4056898054	021312988	96	103	103

Table 3-4. Laboratory Control Sample Recoveries 8260

Analyte	Recovery Limits (%)		QC Batch: 90776			QC Batch: 90808			QC Batch: 91044		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Benzene	70	130	2500	2320	93	2500	2160	87	2500	2480	99
Ethylbenzene	70	130	2500	2440	98	2500	2430	97	2500	2630	105
Toluene	70	130	2500	2350	94	2500	2360	94	2500	2480	99
Xylene (Total)	70	130	7500	7360	98	7500	7630	102	7500	7310	97

Table 3-4. Laboratory Control Sample Recoveries 8260 Continued 1

Analyte	Recovery Limits (%)		QC Batch: 91045			QC Batch: 91174			QC Batch: 91265		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Benzene	70	130	2500	2240	90	2500	2410	96	2500	2620	105
Ethylbenzene	70	130	2500	2390	95	2500	2550	102	2500	2680	107
Toluene	70	130	2500	2310	92	2500	2480	99	2500	2610	104
Xylene (Total)	70	130	7500	7320	98	7500	7180	96	7500	7610	102

Table 3-4. Laboratory Control Sample Recoveries 8260 Continued 2

Analyte	Recovery Limits (%)		QC Batch: 91388			QC Batch: 91390			QC Batch: 91475		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Benzene	70	130	2500	2320	93	2500	2400	96	2500	2500	100
Ethylbenzene	70	130	2500	2570	103	2500	2680	107	2500	2580	103
Toluene	70	130	2500	2480	99	2500	2530	101	2500	2470	99
Xylene (Total)	70	130	7500	7210	96	7500	7320	98	7500	7260	97

Table 3-4. Laboratory Control Sample Recoveries 8260 Continued 3

Analyte	Recovery Limits (%)		QC Batch: 91554			QC Batch: 91702			QC Batch: 91779		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Benzene	70	130	2500	2530	101	2500	2460	98	2500	2260	90
Ethylbenzene	70	130	2500	2760	111	2500	2660	106	2500	2650	106
Toluene	70	130	2500	2620	105	2500	2520	101	2500	2510	100
Xylene (Total)	70	130	7500	7690	103	7500	7360	98	7500	7270	97

Table 3-4. Laboratory Control Sample Recoveries 8260 Continued 4

Analyte	Recovery Limits (%)		QC Batch: 91874			QC Batch: 91948			QC Batch: 92000		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Benzene	70	130	2500	2330	93	2500	2430	97	2500	2490	100
Ethylbenzene	70	130	2500	2590	104	2500	2780	111	2500	2630	105
Toluene	70	130	2500	2480	99	2500	2600	104	2500	2570	103
Xylene (Total)	70	130	7500	7220	96	7500	7710	103	7500	7390	99

Table 3-4. Laboratory Control Sample Recoveries 8260 Continued 5

Analyte	Recovery Limits (%)		QC Batch: 92179			QC Batch: 92239			QC Batch: 92376		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Benzene	70	130	2500	2270	91	2500	2440	98	2500	2400	96
Ethylbenzene	70	130	2500	2620	105	2500	2720	109	2500	2760	110
Toluene	70	130	2500	2350	94	2500	2570	103	2500	2600	104
Xylene (Total)	70	130	7500	7180	96	7500	7530	100	7500	7630	102

Table 3-4. Laboratory Control Sample Recoveries 8260 Continued 6

Analyte	Recovery Limits (%)		QC Batch: 90807			QC Batch: 91005			QC Batch: 91322		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
Benzene	70	130	50	49.0	98	50	47.8	96	50	46.3	93
Ethylbenzene	70	130	50	58.1	116	50	57.1	114	50	57.4	115
Toluene	70	130	50	55.3	111	50	54.9	110	50	53.6	107
Xylene (Total)	70	130	150	169	113	150	167	111	150	167	112

Table 3-4. Laboratory Control Sample Recoveries 8260 Continued 7

Analyte	Recovery Limits (%)		QC Batch: 91516			QC Batch: 91731			QC Batch: 92116		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
Benzene	70	130	50	45.7	91	50	52.8	106	50	52.9	106
Ethylbenzene	70	130	50	57.7	115	50	55.5	111	50	55.9	112
Toluene	70	130	50	54.1	108	50	53.3	107	50	53.6	107
Xylene (Total)	70	130	150	167	111	150	169	112	150	170	113

Table 3-5. Method SW-846 8260 MS/MSD Recoveries

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
012412078	Benzene	5120	2840	55	5120	2860	56	0.9	41.0 UM1
	Ethylbenzene	5120	2720	55	5120	2620	51	4	51.2 UM1
	Toluene	5120	2980	55	5120	2860	54	4	99.5 JM1
	Xylene (Total)	15400	8400	55	15400	7910	51	6	142 J
012412031	Benzene	7420	3820	52	7420	3750	50	2	76.6 UM1
	Ethylbenzene	7420	3800	51	7420	3940	52	4	95.8 UM1
	Toluene	7420	4090	52	7420	4200	53	3	256 M1
	Xylene (Total)	22200	11700	52	22200	11700	52	0.04	287 U
012612191	Benzene	5000	3400	68	5000	3390	68	0.2	39.7 U
	Ethylbenzene	5000	3360	67	5000	3260	65	3	31.4 JM1
	Toluene	5000	5420	106	5000	3390	66	46	101 M1
	Xylene (Total)	15000	9240	61	15000	9150	61	1	92.9 J
012712246	Benzene	5630	3770	67	5630	3850	69	2	44.7 UM1
	Ethylbenzene	5630	3730	65	5630	3620	63	3	77.0 M1
	Toluene	5630	3790	66	5630	3590	63	5	92.4 JM1
	Xylene (Total)	16900	9840	57	16900	9760	58	0.8	134 J
020112447	Benzene	3040	3130	70	3040	3740	90	18	1010
	Ethylbenzene	3040	9080	125	3040	6480	40	33	5270 M1
	Toluene	3040	2890	75	3040	3040	80	5	610
	Xylene (Total)	9120	11400	99	9120	9560	79	18	2410

Table 3-5. EPA 8260 MS/MSD Sample Recoveries Continued 1

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
013112363	Benzene	4360	3850	75	4360	4210	82	9	595
	Ethylbenzene	4360	3760	84	4360	3880	87	3	80.8
	Toluene	4360	3670	81	4360	3850	84	5	159
	Xylene (Total)	13100	10900	71	13100	11700	76	7	1700
020212511	Benzene	5690	3330	59	5690	3670	64	10	45.6 UM1
	Ethylbenzene	5690	2950	51	5690	3330	58	12	56.9 UM1
	Toluene	5690	3210	55	5690	3470	59	8	52.4 JM1
	Xylene (Total)	17100	8150	47	17100	9060	52	11	82.7 J
020212474	Benzene	5570	3590	64	5570	4070	73	13	44.2 UM1
	Ethylbenzene	5570	3720	67	5570	4200	75	12	55.2 UM1
	Toluene	5570	3820	64	5570	4250	72	11	238 M1
	Xylene (Total)	16700	10400	62	16700	11600	69	11	166 U
020312591	Benzene	4900	3650	72	4900	3630	72	0.4	89.4
	Ethylbenzene	4900	3530	71	4900	3530	71	0.02	34.2 J
	Toluene	4900	3580	72	4900	3660	73	2	70.5 J
	Xylene (Total)	14700	9690	64	14700	9860	65	2	217 M1
020612657	Benzene	4630	3470	71	4630	3660	76	5	191
	Ethylbenzene	4630	3930	79	4630	3840	77	3	274
	Toluene	4630	3750	77	4630	3730	77	0.5	170
	Xylene (Total)	13900	10300	70	13900	10500	72	2	554

Table 3-5. EPA 8260 MS/MSD Sample Recoveries Continued 2

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
020712722	Benzene	4380	6800	91	4380	6870	92	1	2830
	Ethylbenzene	4380	28700	391	4380	16900	120	52	11600 M1
	Toluene	4380	3480	72	4380	3200	66	8	310 JM1
	Xylene (Total)	13100	24000	132	13100	17600	83	31	6720
020812776	Benzene	4640	7440	70	4640	6930	58	7	4200 M1
	Ethylbenzene	4640	57300	141	4640	57400	142	0.2	50800 M1
	Toluene	4640	3740 J	44	4640	4700	64		1700 JM1
	Xylene (Total)	13900	49000	93	13900	48200	86	2	36100
020912868	Benzene	3020	2940	98	3020	2970	98	1	24.2 U
	Ethylbenzene	3020	3300	109	3020	3460	114	5	15.6 J
	Toluene	3020	3080	102	3020	3250	106	5	15.7 J
	Xylene (Total)	9060	9110	101	9060	9470	104	4	90.6 U
021312921	Benzene	6050	3730	62	6050	3430	57	8	48.4 UM1
	Ethylbenzene	6050	3340	55	6050	3420	56	2	60.5 UM1
	Toluene	6050	3610	58	6050	3690	60	2	73.1 JM1
	Xylene (Total)	18200	9300	51	18200	9380	52	0.8	182 UM1
021012887	Benzene	5000	3800	75	5000	3880	78	2	34.9 J
	Ethylbenzene	5000	3920	77	5000	3530	71	10	46.2 J
	Toluene	5000	4370	83	5000	3860	74	12	217
	Xylene (Total)	15000	10600	69	15000	9520	63	11	171 M1

Table 3-5. EPA 8260 MS/MSD Sample Recoveries Continued 3

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
021312946	Benzene	3150	3240	97	3150	3340	100	3	188
	Ethylbenzene	3150	3470	96	3150	4340	124	22	443
	Toluene	3150	3260	102	3150	3260	102	0.2	48.8 J
	Xylene (Total)	9450	9430	96	9450	10100	103	6	337

Table 3-6. Method SW-846 8260 Field Duplicates

Analyte	Sample ID: 012412017		Sample ID: 012412018		RPD	Sample ID: 012512087		Sample ID: 012512088		RPD	Sample ID: 012712225		Sample ID: 012712239		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
1,2,4-Trimethylbenzene	51.6	U	51.9	U	0	49.4	U	46.5	U	0	765		879		14
1,3,5-Trimethylbenzene	25.0	U	25.2	U	0	23.9	U	22.5	U	0	278		287		3
Benzene	30.5	U	30.7	U	0	29.2	U	27.5	U	0	110		99.0		11
Ethylbenzene	27.8	U	28.0	U	0	26.6	U	25.1	U	0	79.9		114		35
Toluene	64.6	J	56.8	J	13	49.8	J	43.5	J	14	186		124		40
Xylene (Total)	67.0	U	67.5	U	0	64.2	U	60.4	U	0	433		419		3

Table 3-6. Method SW-846 8260 Field Duplicates Continued 1

Analyte	Sample ID: 013012257		Sample ID: 013012258		RPD	Sample ID: 013012302		Sample ID: 013012303		RPD	Sample ID: 020112436		Sample ID: 020112437		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
1,2,4-Trimethylbenzene	50.7	U	55.6	U	0	46.6	U	49.9	U	0	43.2	U	44.2	U	0
1,3,5-Trimethylbenzene	24.6	U	27.8	J	NC	22.6	U	24.2	U	0	20.9	U	21.4	U	0
Benzene	29.9	U	33.8	J	NC	27.5	U	29.5	U	0	50.1		52.6		5
Ethylbenzene	30.0	J	67.7	J	77	25.1	U	26.9	U	0	23.3	U	23.8	U	0
Toluene	47.3	J	74.9	J	45	25.0	J	20.2	U	21	191		168		13
Xylene (Total)	65.9	U	84.9	J	NC	60.5	U	64.9	U	0	56.2	U	57.4	U	0

Table 3-6. Method SW-846 8260 Field Duplicates Continued 2

Analyte	Sample ID: 020112469		Sample ID: 020112471		RPD	Sample ID: 020212541		Sample ID: 020212558		RPD	Sample ID: 020312569		Sample ID: 020312576		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
1,2,4-Trimethylbenzene	46.1	U	48.8	U	0	1840		1420		26	502		505		1
1,3,5-Trimethylbenzene	22.3	U	23.6	U	0	438		353		21	172		175		2
Benzene	27.2	U	28.8	U	0	133		118		12	71.6		74.7		4
Ethylbenzene	24.8	U	26.3	U	0	46.6	J	44.6	J	4	46.3		71.3		43
Toluene	84.7	J	92.0	J	8	35.6	J	37.4	J	5	107		116		8
Xylene (Total)	59.9	U	63.4	U	0	1380		1040		28	248		257		4

Table 3-6. Method SW-846 8260 Field Duplicates Continued 3

Analyte	Sample ID: 020612639		Sample ID: 020612641		RPD	Sample ID: 020712694		Sample ID: 020712706		RPD	Sample ID: 020812764		Sample ID: 020812770		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
1,2,4-Trimethylbenzene	2110		1850		13	497		623		23	627		2320		115
1,3,5-Trimethylbenzene	739		613		19	171		205		18	245		708		97
Benzene	242		160		41	593		495		18	226		393		54
Ethylbenzene	955		815		16	291		175		50	375		1680		127
Toluene	368		278	J	28	251		275		9	120		152		24
Xylene (Total)	1910		1520		23	756		696		8	556		1490		91

Table 3-6. Method SW-846 8260 Field Duplicates Continued 4

Analyte	Sample ID: 020912823		Sample ID: 020912824		RPD	Sample ID: 021012882		Sample ID: 021012883		RPD	Sample ID: 021012898		Sample ID: 021012901		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
1,2,4-Trimethylbenzene	381		363		5	22.8	U	22.5	U	0	282		257		9
1,3,5-Trimethylbenzene	212		191		10	11.0	U	10.9	U	0	103		96.6	J	6
Benzene	48.3		50.9		5	13.5	U	13.3	U	0	93.4		81.0		14
Ethylbenzene	179		166		8	12.3	U	12.1	U	0	40.3	J	20.4	U	NC
Toluene	184		146		23	9.2	U	9.1	U	0	125		109		14
Xylene (Total)	276		270		2	29.6	U	29.2	U	0	185		140	J	28

Table 3-7. Method 8270 Method Blank Analytical Results Water Samples (µg/L)

Analyte	QC Batch: 90797	QC Batch: 90823	QC Batch: 91100	QC Batch: 91427	QC Batch: 91594	QC Batch: 91791	QC Batch: 92120
2,4-Dimethylphenol	5.0 U						
2-Methylphenol(o-Cresol)	5.0 U						
3&4-Methylphenol(m&p Cresol)	5.0 U						
Phenol	5.0 U						

Table 3-7. Method 8270 Method Blank Analytical Results Soil Samples (µg/Kg)

Analyte	QC Batch: 90845	QC Batch: 90846	QC Batch: 91076	QC Batch: 91077	QC Batch: 91092	QC Batch: 91093	QC Batch: 91221	QC Batch: 91315	QC Batch: 91509	QC Batch: 91525
2,4-Dimethylphenol	167 U									
2-Methylphenol(o-Cresol)	167 U									
3&4-Methylphenol(m&p Cresol)	167 U									
Phenol	167 U									

Table 3-7. Method 8270 Method Blank Analytical Results Soil Samples (µg/Kg) Continued

Analyte	QC Batch: 91722	QC Batch: 91758	QC Batch: 91831	QC Batch: 91945	QC Batch: 92110	QC Batch: 92219	QC Batch: 92303	QC Batch: 92304	QC Batch: 92411	QC Batch: 92509	QC Batch: 92573
2,4-Dimethylphenol	167 U										
2-Methylphenol(o-Cresol)	167 U										
3&4-Methylphenol(m&p Cresol)	167 U										
Phenol	167 U										

Table 3-8. Surrogate Compound Recovery Data for Method 8270

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056201001	012312001	98	74	90
4056201002	012312002	92	66	81
4056201003	012312006	86	68	78
4056201004	012312009	81	70	84
4056201005	012312010	80	60	70
4056201006	012312012	32	54	66
4056201007	012312016	80	44	32
4056273002	012412083	85	43	32
4056273004	012712150	93	44	30
4056282001	012412017	87	65	82
4056282002	012412018	93	73	86
4056282003	012412019	81	73	85
4056282004	012412020	100	66	82
4056282005	012412025	85	67	77
4056282006	012412026	64	67	77
4056282007	012412028	84	74	89
4056282008	012412029	88	68	78
4056282009	012412031	88	71	82
4056282010	012412032	90	66	82
4056282011	012412033	92	75	89
4056282012	012412049	90	72	86
4056282013	012412050	69	64	78
4056282014	012412051	89	64	81
4056282015	012412066	88	71	88

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056282016	012412067	77	67	80
4056282017	012412068	93	70	87
4056282018	012412069	86	62	81
4056282019	012412078	71	54	66
4056282020	012412079	77	69	80
4056282021	012412081	56	62	68
4056282022	012512085	97	57	70
4056282023	012512086	87	59	78
4056282024	012512087	80	61	76
4056282025	012512088	83	54	72
4056282026	012512103	94	62	79
4056282027	012512104	90	62	73
4056282028	012512105	87	69	82
4056282029	012512120	87	67	79
4056282030	012512121	91	53	71
4056282031	012512122	88	63	77
4056282032	012512124	86	61	76
4056282033	012512135	71	60	69
4056282034	012512136	47	61	68
4056308001	012512137	79	72	83
4056308002	012512138	68	68	75
4056308003	012512139	70	70	79
4056308004	012512147	74	55	70
4056308005	012512149	36	57	61
4056308006	012612151	76	62	76

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056308007	012612152	81	67	78
4056308008	012612153	87	59	75
4056308009	012612160	82	61	78
4056309001	012612161	86	71	84
4056309002	012612162	74	75	81
4056309003	012612163	87	69	79
4056309004	012612164	71	76	75
4056309005	012612165	74	64	78
4056309006	012612176	81	66	84
4056309007	012612177	86	69	83
4056309008	012612178	75	69	79
4056309009	012612187	20	38	40
4056309010	012612188	39	58	68
4056309011	012612189	77	78	79
4056309012	012612190	70	43	60
4056309013	012612191	78	71	76
4056309014	012712204	69	70	79
4056309015	012712205	77	79	79
4056309016	012712206	78	71	77
4056364001	013012280	75	71	71
4056364002	013012284	80	71	83
4056364003	013012285	36	56	61
4056364004	013012302	72	57	72
4056364005	013012303	73	64	76
4056364006	013012304	80	48	72

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056364007	013012305	72	72	73
4056364008	013012318	78	67	83
4056364009	013012319	82	67	77
4056364010	013012320	68	57	74
4056364011	013012330	52	54	81
4056364012	013012331	57	53	73
4056365001	013012255	94	51	38
4056365002	013112333	84	50	35
4056365003	020112334	89	50	37
4056369001	012712217	83	56	78
4056369002	012712218	74	46	70
4056369003	012712219	82	69	76
4056369004	012712225	77	64	69
4056369005	012712239	82	58	82
4056369006	012712226	83	73	85
4056369007	012712228	81	68	71
4056369008	012712229	73	58	65
4056369009	012712230	83	62	69
4056369010	012712231	79	63	79
4056369011	012712236	75	72	88
4056369012	012712240	83	65	72
4056369013	012712241	81	59	73
4056369014	012712242	81	60	75
4056369015	012712246	84	66	81
4056369016	012712252	48	62	74

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056369017	012712253	68	70	85
4056370001	013012256	75	56	65
4056370002	013012257	71	50	59
4056370003	013012258	74	55	71
4056370004	013012259	80	58	66
4056370005	013012287	71	60	73
4056370006	013012288	69	65	79
4056370007	013012289	76	66	80
4056370008	013012295	71	66	80
4056370009	013012299	62	58	69
4056370010	013012300	49	55	65
4056370011	013012272	59	52	64
4056370012	013012273	61	51	62
4056370013	013012274	84	71	92
4056464001	020212472	86	54	37
4056464002	020312491	84	59	41
4056465001	020112450	79	64	81
4056465002	020112451	87	79	97
4056465003	020112452	71	67	80
4056465004	020112465	79	65	83
4056465005	020112466	67	70	80
4056465006	020112467	89	76	87
4056465007	020112468	81	56	72
4056465008	020112469	79	70	79
4056465009	020112471	75	77	80

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056466001	013112397	81	65	84
4056466002	013112398	52	43	62
4056466003	013112399	54	63	75
4056466004	013112412	79	71	89
4056466005	013112413	70	70	89
4056466006	020112414	88	70	83
4056466007	020112415	93	69	79
4056466008	020112416	55	51	71
4056466009	020112417	81	64	71
4056466010	020112418	89	66	76
4056466011	020112419	48	65	77
4056466012	020112420	50	49	64
4056467001	013112335	90	67	84
4056467002	013112336	86	63	74
4056467003	013112337	51	60	73
4056467004	013112350	89	65	74
4056467005	013112351	85	63	78
4056467006	013112352	80	71	83
4056467007	013112363	58	64	84
4056467008	013112364	77	78	90
4056467009	013112365	84	65	73
4056467010	013112366	71	49	70
4056467011	013112367	76	65	78
4056467012	013112382	73	63	71
4056467013	013112383	79	60	69

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056467014	013112384	85	72	87
4056468001	020112433	87	61	82
4056468002	020112434	79	64	79
4056468003	020112435	79	62	82
4056468004	020112436	80	56	73
4056468005	020112437	80	64	83
4056468006	020112438	58	60	73
4056468007	020112439	73	49	72
4056468008	020112440	43	69	71
4056468009	020112473	56	64	76
4056468010	020112442	0 S4	0 S4	0 S4
4056468011	020112445	61	62	80
4056468012	020112447	51	70	86
4056552001	020212474	77	49	70
4056552002	020212475	70	40	57
4056552003	020212476	66	58	64
4056552004	020212482	65	52	65
4056552005	020212490	68	50	68
4056552006	020212492	69	59	71
4056552007	020212493	71	58	74
4056552008	020212494	65	61	71
4056552009	020212509	81	63	77
4056552010	020212510	71	71	87
4056552011	020212511	78	72	90
4056552012	020212526	85	69	79

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056552013	020212527	80	75	85
4056553001	020212528	80	70	77
4056553002	020212540	62	62	72
4056553003	020212541	83	70	85
4056553004	020212558	80	65	76
4056553005	020212542	73	73	83
4056553006	020212543	80	59	78
4056553007	020212544	86	75	80
4056553008	020212545	75	63	73
4056631001	020312559	80	65	83
4056631002	020312560	67	40	57
4056631003	020312561	81	67	85
4056631004	020312568	75	72	81
4056631005	020312569	75	69	77
4056631006	020312576	71	48	64
4056631007	020312575	62	53	70
4056631008	020312577	79	62	75
4056631009	020312578	83	70	88
4056631010	020312579	67	51	69
4056631011	020312587	73	59	72
4056631012	020312591	65	66	76
4056631013	020312592	74	57	66
4056631014	020312594	85	73	91
4056631015	020312595	68	51	68
4056631016	020312596	81	68	78

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056631017	020312608	84	66	80
4056631018	020312609	58	39	54
4056631019	020312612	90	66	74
4056631020	020312613	59	39	54
4056631021	020312614	86	68	78
4056631022	020312627	74	63	77
4056631023	020312628	75	76	86
4056631024	020612629	66	66	78
4056631025	020612630	70	48	63
4056631026	020612631	85	57	74
4056631027	020612639	81	65	78
4056631028	020612641	67	66	72
4056631029	020612640	78	72	89
4056631030	020612643	97	60	76
4056631031	020612644	86	63	77
4056631032	020612645	87	61	81
4056631033	020612657	74	70	79
4056631034	020612658	61	59	67
4056631035	020612659	89	69	89
4056631036	020612660	82	71	90
4056631037	020612661	65	41	55
4056631038	020612662	84	57	72
4056631039	020612674	64	53	68
4056631040	020612675	55	52	63
4056631041	020612676	88	50	70

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056631042	020612677	89	68	87
4056631043	020612678	79	57	74
4056631044	020612683	148 S3	116	144 S3
4056631045	020612691	68	69	81
4056639001	020612611	71	52	35
4056639002	020712642	72	54	36
4056693001	020712693	55	38	54
4056693002	020712694	59	59	75
4056693003	020712706	68	56	68
4056693004	020712703	76	82	91
4056693005	020712704	62	50	69
4056693006	020712705	61	41	51
4056693007	020712707	69	64	77
4056693008	020712708	66	75	78
4056693009	020712709	73	76	83
4056693010	020712722	67	68	84
4056693011	020712723	71	74	90
4056725001	020812724	98	52	39
4056725002	020912771	92	48	33
4056725004	021012811	86	47	33
4056730001	020712725	103	76	91
4056730002	020712726	91	72	83
4056730003	020712727	89	77	91
4056730004	020712739	81	75	80
4056730005	020712740	68	71	79

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056730006	020712741	80	70	81
4056730007	020712742	76	59	78
4056730008	020712743	68	61	72
4056730009	020712751	78	65	83
4056730010	020712755	58	64	76
4056730011	020812759	59	59	71
4056730012	020812760	89	68	90
4056730013	020812761	75	68	81
4056730014	020812764	68	71	85
4056730015	020812770	78	67	87
4056730016	020812765	55	65	78
4056730017	020812769	52	70	73
4056730018	020812772	69	65	83
4056730019	020812773	66	60	88
4056730020	020812776	56	77	89
4056730021	020812777	44	67	79
4056730022	020812779	86	65	83
4056730023	020812780	89	72	84
4056730024	020812781	87	63	81
4056730025	020812790	74	62	89
4056730026	020812791	60	58	70
4056730027	020812794	87	63	85
4056730028	020812795	80	70	83
4056730029	020812796	81	58	77
4056730030	020812808	54	64	81

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056730031	020812809	47	63	78
4056766001	020912812	78	70	90
4056766002	020912813	77	74	94
4056766003	020912814	86	72	81
4056766004	020912822	68	59	79
4056766005	020912823	59	52	76
4056766006	020912824	69	70	92
4056766007	020912825	73	50	75
4056766008	020912826	79	69	97
4056766009	020912827	77	69	88
4056766010	020912835	80	70	86
4056766011	020912841	52	58	73
4056766012	020912842	87	66	78
4056766013	020912843	81	60	87
4056766014	020912844	86	68	83
4056766015	020912854	68	71	90
4056766016	020912855	77	72	91
4056766017	020912858	93	79	95
4056766018	020912861	83	71	87
4056766019	020912868	51	70	89
4056894001	021312869	96	45	33
4056898001	021012870	92	74	95
4056898002	021012871	93	75	95
4056898003	021012873	72	66	79
4056898004	021012882	68	75	92

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056898005	021012883	63	70	86
4056898006	021012884	91	72	93
4056898007	021012885	65	56	72
4056898008	021012886	68	55	73
4056898009	021012887	73	64	73
4056898010	021012888	86	76	98
4056898011	021012889	85	70	90
4056898012	021012890	62	66	72
4056898013	021012898	72	69	80
4056898014	021012901	75	65	77
4056898015	021012899	69	69	86
4056898016	021012902	84	61	81
4056898017	021012903	72	58	75
4056898018	021012904	70	58	71
4056898019	021012905	75	53	69
4056898020	021012918	98	65	82
4056898021	021012919	98	70	86
4056898022	021012915	69	65	76
4056898023	021012916	77	78	99
4056898024	021312920	94	68	81
4056898025	021312921	72	71	80
4056898026	021312922	94	74	86
4056898027	021312929	60	64	71
4056898028	021312933	76	73	92
4056898029	021312934	36	57	75

Lab Sample Number	Field ID	2,4,6-Tribromophenol (S)	2-Fluorophenol (S)	Phenol-d ₆ (S)
4056898030	021312935	70	77	86
4056898031	021312936	69	74	81
4056898032	021312937	94	77	93
4056898033	021312945	66	65	78
4056898034	021312946	61	76	84
4056898035	021312948	83	71	97
4056898036	021312949	69	70	90
4056898037	021312963	76	65	86
4056898038	021312950	93	66	85
4056898039	021312958	74	70	78
4056898040	021312960	76	67	83
4056898041	021312961	85	71	82
4056898042	021312964	137 S3	118	147 S3
4056898043	021312965	93	75	89
4056898044	021312966	69	68	78
4056898045	021312971	73	67	78
4056898046	021312972	65	64	75
4056898047	021312973	73	71	80
4056898048	021312975	71	64	73
4056898049	021312976	72	69	84
4056898050	021312977	71	74	85
4056898051	021312981	92	70	89
4056898052	021312985	83	71	83
4056898053	021312987	57	58	65
4056898054	021312988	83	73	90

Table 3-9. Method 8270 Laboratory Control Sample Results Summary

Analyte	Recovery Limits (%)		QC Batch: 90797			QC Batch: 90823			QC Batch: 91100		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2,4-Dimethylphenol	17	130	50	32.3	65	50	33.0	66	50	39.3	79
2-Methylphenol(o-Cresol)	36	130	50	40.6	81	50	40.7	81	50	42.3	85
3&4-Methylphenol(m&p Cresol)	34	130	50	35.1	70	50	35.0	70	50	38.1	76
Phenol	26	130	50	21.8	44	50	21.0	42	50	21.0	42

Table 3-9. Method 8270 Laboratory Control Sample Results Summary Continued 1

Analyte	Recovery Limits (%)		QC Batch: 90845			QC Batch: 90846			QC Batch: 91076		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2,4-Dimethylphenol	57	130	1670	1460	88	1670	1390	83	1670	1460	88
2-Methylphenol(o-Cresol)	58	130	1670	1440	87	1670	1430	86	1670	1510	90
3&4-Methylphenol(m&p Cresol)	56	130	1670	1430	86	1670	1460	87	1670	1410	85
Phenol	57	130	1670	1290	77	1670	1290	77	1670	1420	85

Table 3-9. Method 8270 Laboratory Control Sample Results Summary Continued 2

Analyte	Recovery Limits (%)		QC Batch: 91427			QC Batch: 91594			QC Batch: 91791		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2,4-Dimethylphenol	17	130	50	38.3	77	50	34.2	68	50	38.6	77
2-Methylphenol(o-Cresol)	36	130	50	45.8	92	50	36.3	73	50	41.9	84
3&4-Methylphenol(m&p Cresol)	34	130	50	41.7	83	50	31.5	63	50	36.3	73
Phenol	26	130	50	25.0	50	50	21.0	42	50	24.1	48

Table 3-9. Method 8270 Laboratory Control Sample Results Summary Continued 3

Analyte	Recovery Limits (%)		QC Batch: 91077			QC Batch: 91092			QC Batch: 91093		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2,4-Dimethylphenol	57	130	1670	1490	89	1670	1400	84	1670	1180	71
2-Methylphenol(o-Cresol)	58	130	1670	1500	90	1670	1470	88	1670	1300	78
3&4-Methylphenol(m&p Cresol)	56	130	1670	1500	90	1670	1420	85	1670	1250	75
Phenol	57	130	1670	1550	93	1670	1530	92	1670	1390	83

Table 3-9. Method 8270 Laboratory Control Sample Results Summary Continued 4

Analyte	Recovery Limits (%)		QC Batch: 92120		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)
2,4-Dimethylphenol	17	130	50	15.8	32
2-Methylphenol(o-Cresol)	36	130	50	38.6	77
3&4-Methylphenol(m&p Cresol)	34	130	50	34.0	68
Phenol	26	130	50	24.2	48

Table 3-9. Method 8270 Laboratory Control Sample Results Summary Continued 5

Analyte	Recovery Limits (%)		QC Batch: 91221			QC Batch: 91315			QC Batch: 91509		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2,4-Dimethylphenol	57	130	1670	1480	89	1670	1330	80	1670	1570	94
2-Methylphenol(o-Cresol)	58	130	1670	1550	93	1670	1530	92	1670	1550	93
3&4-Methylphenol(m&p Cresol)	56	130	1670	1460	88	1670	1460	88	1670	1610	96
Phenol	57	130	1670	1450	87	1670	1480	89	1670	1520	91

Table 3-9. Method 8270 Laboratory Control Sample Results Summary Continued 6

Analyte	Recovery Limits (%)		QC Batch: 91525			QC Batch: 91722			QC Batch: 91758		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2,4-Dimethylphenol	57	130	1670	1390	84	1670	1380	83	1670	1260	75
2-Methylphenol(o-Cresol)	58	130	1670	1450	87	1670	1360	82	1670	1310	79
3&4-Methylphenol(m&p Cresol)	56	130	1670	1360	82	1670	1360	82	1670	1280	77
Phenol	57	130	1670	1520	91	1670	1270	76	1670	1180	71

Table 3-9. Method 8270 Laboratory Control Sample Results Summary Continued 7

Analyte	Recovery Limits (%)		QC Batch: 91831			QC Batch: 91945			QC Batch: 92110		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2,4-Dimethylphenol	57	130	1670	1210	73	1670	1640	98	1670	1640	98
2-Methylphenol(o-Cresol)	58	130	1670	1270	76	1670	1600	96	1670	1670	100
3&4-Methylphenol(m&p Cresol)	56	130	1670	1250	75	1670	1580	95	1670	1600	96
Phenol	57	130	1670	1250	75	1670	1560	93	1670	1640	98

Table 3-9. Method 8270 Laboratory Control Sample Results Summary Continued 8

Analyte	Recovery Limits (%)		QC Batch: 92219			QC Batch: 92303			QC Batch: 92304		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2,4-Dimethylphenol	57	130	1670	1260	76	1670	1510	91	1670	1430	86
2-Methylphenol(o-Cresol)	58	130	1670	1340	81	1670	1540	92	1670	1400	84
3&4-Methylphenol(m&p Cresol)	56	130	1670	1350	81	1670	1450	87	1670	1290	78
Phenol	57	130	1670	1330	80	1670	1430	86	1670	1380	83

Table 3-9. Method 8270 Laboratory Control Sample Results Summary Continued 9

Analyte	Recovery Limits (%)		QC Batch: 92411			QC Batch: 92509			QC Batch: 92573		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2,4-Dimethylphenol	57	130	1670	1550	93	1670	1600	96	1670	1320	79
2-Methylphenol(o-Cresol)	58	130	1670	1680	101	1670	1610	96	1670	1390	84
3&4-Methylphenol(m&p Cresol)	56	130	1670	1580	95	1670	1550	93	1670	1330	80
Phenol	57	130	1670	1580	95	1670	1390	83	1670	1300	78

Table 3-10. Method SW-846 8270 MS/MSD Recoveries

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
012412031	2,4-Dimethylphenol	28700	28900	101	28700	30700	107	6	2880 U
	2-Methylphenol(o-Cresol)	28700	26200	91	28700	27800	97	6	2880 U
	3&4-Methylphenol(m&p Cresol)	28700	26500	90	28700	29100	99	9	662 J
	Phenol	28700	23200	81	28700	24900	87	7	2880 U
012412078	2,4-Dimethylphenol	20500	18000	88	20500	18300	89	2	2050 U
	2-Methylphenol(o-Cresol)	20500	14800	72	20500	17200	84	15	2050 U
	3&4-Methylphenol(m&p Cresol)	20500	15800	75	20500	17900	85	12	380 J
	Phenol	20500	13600	66	20500	16400	79	18	2050 U
012612191	2,4-Dimethylphenol	19900	20800	105	19900	21100	106	1	1990 U
	2-Methylphenol(o-Cresol)	19900	17900	90	19900	17300	87	4	1990 U
	3&4-Methylphenol(m&p Cresol)	19900	17300	85	19900	17800	87	3	412 J
	Phenol	19900	16900	85	19900	16600	84	2	1990 U
012712246	2,4-Dimethylphenol	22300	26000	117	22300	20900	94	22	2240 U
	2-Methylphenol(o-Cresol)	22300	22500	101	22300	17800	80	23	2240 U
	3&4-Methylphenol(m&p Cresol)	22300	21600	96	22300	18100	80	18	283 J
	Phenol	22300	21000	94	22300	16500	73	24	2240 U
013112363	2,4-Dimethylphenol	17400	17400	100	17400	18100	104	4	8730 U
	2-Methylphenol(o-Cresol)	17400	15400	88	17400	17600	101	14	8730 U
	3&4-Methylphenol(m&p Cresol)	17400	16300	81	17400	18400	92	12	2250 J
	Phenol	17400	14300	82	17400	16000	92	11	8730 UD3

Table 2-9. EPA 8270 MS/MSD Sample Recoveries Continued 1

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
020212511	2,4-Dimethylphenol	22800	21500	94	22800	22600	99	5	2280 U
	2-Methylphenol(o-Cresol)	22800	20900	92	22800	21500	94	3	2280 U
	3&4-Methylphenol(m&p Cresol)	22800	21500	90	22800	22200	93	3	978 J
	Phenol	22800	18800	82	22800	18300	80	3	2280 U
020112447	2,4-Dimethylphenol	12100	10600	87	12100	11200	93	6	1210 U
	2-Methylphenol(o-Cresol)	12100	10900	90	12100	11200	93	3	1210 U
	3&4-Methylphenol(m&p Cresol)	12100	11300	93	12100	11100	92	2	1210 U
	Phenol	12100	9950	82	12100	9740	81	2	1210 U
020212474	2,4-Dimethylphenol	22100	21600	98	22100	22700	103	5	2210 U
	2-Methylphenol(o-Cresol)	22100	20100	91	22100	20100	91	0.3	2210 U
	3&4-Methylphenol(m&p Cresol)	22100	19700	86	22100	20700	90	5	787 J
	Phenol	22100	19000	85	22100	18700	84	1	2210 U
020312591	2,4-Dimethylphenol	19500	17000	87	19500	16100	83	6	3900 U
	2-Methylphenol(o-Cresol)	19500	15900	82	19500	13800	71	14	3900 U
	3&4-Methylphenol(m&p Cresol)	19500	15500	77	19500	13900	69	11	483 J
	Phenol	19500	15300	79	19500	13800	71	10	3900 UD3
020612657	2,4-Dimethylphenol	18400	15500	84	18400	16900	92	9	7370 U
	2-Methylphenol(o-Cresol)	18400	15100	82	18400	15200	83	0.4	7370 U
	3&4-Methylphenol(m&p Cresol)	18400	14600	80	18400	15400	84	5	7370 U
	Phenol	18400	14500	79	18400	15700	85	8	7370 UD3

Table 2-9. EPA 8270 MS/MSD Sample Recoveries Continued 2

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
020712722	2,4-Dimethylphenol	17400	17600	101	17400	16000	92	9	8710 U
	2-Methylphenol(o-Cresol)	17400	16300	94	17400	14400	83	13	8710 U
	3&4-Methylphenol(m&p Cresol)	17400	15100	87	17400	13400	77	12	8710 U
	Phenol	17400	16200	93	17400	14200	82	13	8710 UD3
020812776	2,4-Dimethylphenol	18500	15000 J	81	18500	17500	94	15	18600 U
	2-Methylphenol(o-Cresol)	18500	14800 J	80	18500	15900	86	7	18600 U
	3&4-Methylphenol(m&p Cresol)	18500	13200 J	71	18500	16100	87	20	18600 U
	Phenol	18500	13800 J	74	18500	16200	87	16	18600 UD3
020912868	2,4-Dimethylphenol	12100	10700	88	12100	11300	94	6	1210 U
	2-Methylphenol(o-Cresol)	12100	11300	93	12100	11400	95	1	1210 U
	3&4-Methylphenol(m&p Cresol)	12100	10700	89	12100	11100	92	4	1210 U
	Phenol	12100	10700	89	12100	9810	81	9	1210 U
021012887	2,4-Dimethylphenol	22200	21300	96	22200	20100	90	6	2230 U
	2-Methylphenol(o-Cresol)	22200	19900	90	22200	19000	85	5	2230 U
	3&4-Methylphenol(m&p Cresol)	22200	19000	80	22200	19400	82	2	1090 J
	Phenol	22200	18000	80	22200	17400	77	4	2230 U
021312921	2,4-Dimethylphenol	24200	23800	98	24200	24100	100	2	2430 U
	2-Methylphenol(o-Cresol)	24200	20800	86	24200	21300	88	3	2430 U
	3&4-Methylphenol(m&p Cresol)	24200	21100	83	24200	21900	86	4	993 J
	Phenol	24200	19000	79	24200	19400	80	2	2430 U

Table 2-9. EPA 8270 MS/MSD Sample Recoveries Continued 3

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
021312946	2,4-Dimethylphenol	12500	11700	94	12500	12800	102	9	1260 U
	2-Methylphenol(o-Cresol)	12500	10600	84	12500	11300	90	7	1260 U
	3&4-Methylphenol(m&p Cresol)	12500	10600	84	12500	11100	88	5	1260 U
	Phenol	12500	9720	77	12500	10200	82	5	1260 U

Table 3-11. Method SW-846 8270 Field Duplicates

Analyte	Sample ID: 012412017		Sample ID: 012412018		RPD	Sample ID: 012512087		Sample ID: 012512088		RPD	Sample ID: 012712225		Sample ID: 012712239		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2,4-Dimethylphenol	1360	U	1370	U	0	1300	U	1230	U	0	896	U	1750	U	0
2-Methylphenol(o-Cresol)	1360	U	1370	U	0	1300	U	1230	U	0	896	U	1750	U	0
3&4-Methylphenol(m&p Cresol)	326	J	285	U	NC	271	U	255	U	0	558	J	1150	J	69
Phenol	323	U	325	U	0	310	U	291	U	0	213	U	415	UD3	0

Table 3-11. Method SW-846 8270 Field Duplicates Continued 1

Analyte	Sample ID: 013012257		Sample ID: 013012258		RPD	Sample ID: 013012302		Sample ID: 013012303		RPD	Sample ID: 020112436		Sample ID: 020112437		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2,4-Dimethylphenol	1340	U	1380	U	0	1230	U	1240	U	0	1140	U	1160	U	0
2-Methylphenol(o-Cresol)	1340	U	1380	U	0	1230	U	1240	U	0	1140	U	1160	U	0
3&4-Methylphenol(m&p Cresol)	279	U	287	U	0	256	U	258	U	0	412	J	594	J	36
Phenol	318	U	328	U	0	292	U	294	U	0	271	U	277	U	0

Table 3-11. Method SW-846 8270 Field Duplicates Continued 2

Analyte	Sample ID: 020112469		Sample ID: 020112471		RPD	Sample ID: 020212541		Sample ID: 020212558		RPD	Sample ID: 020312569		Sample ID: 020312576		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2,4-Dimethylphenol	1210	U	1210	U	0	1950	U	3730	U	0	924	U	964	U	0
2-Methylphenol(o-Cresol)	1210	U	1210	U	0	1950	U	3730	U	0	924	U	964	U	0
3&4-Methylphenol(m&p Cresol)	438	J	383	J	13	407	U	779	U	0	627	J	572	J	9
Phenol	1240	J	287	U	NC	465	UD3	888	UD3	0	220	U	229	U	0

Table 3-11. Method SW-846 8270 Field Duplicates Continued 3

Analyte	Sample ID: 020612639		Sample ID: 020612641		RPD	Sample ID: 020712694		Sample ID: 020712706		RPD	Sample ID: 020812764		Sample ID: 020812770		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2,4-Dimethylphenol	1840	U	1510	U	0	1960	U	2050	U	0	1300	U	1350	U	0
2-Methylphenol(o-Cresol)	1840	U	1510	U	0	1960	U	2050	U	0	1300	U	1350	U	0
3&4-Methylphenol(m&p Cresol)	553	J	315	U	NC	1380	J	1360	J	1	270	U	282	U	0
Phenol	437	UD3	359	UD3	0	465	UD3	487	UD3	0	308	UD3	322	UD3	0

Table 3-11. Method SW-846 8270 Field Duplicates Continued 4

Analyte	Sample ID: 020912823		Sample ID: 020912824		RPD	Sample ID: 021012882		Sample ID: 021012883		RPD	Sample ID: 021012898		Sample ID: 021012901		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2,4-Dimethylphenol	3090	U	1870	U	0	600	U	593	U	0	855	U	2000	U	0
2-Methylphenol(o-Cresol)	3090	U	1870	U	0	600	U	593	U	0	855	U	2000	U	0
3&4-Methylphenol(m&p Cresol)	792	J	1100	J	33	125	U	124	U	0	379	J	726	J	63
Phenol	735	UD3	444	UD3	0	143	U	141	U	0	203	U	475	UD3	0

Table 3-12. Method 8270-SIM Method Blank Analytical Results Summary Water Samples (µg/L)

Analyte	QC Batch: 90792	QC Batch: 90821	QC Batch: 90942	QC Batch: 91039	QC Batch: 91300	QC Batch: 91518	QC Batch: 91792	QC Batch: 92044
2-Methylnaphthalene	0.050 U	0.050 U	0.050 U		0.008 J	0.050 U	0.050 U	0.050 U
Acenaphthene	0.050 U							
Acenaphthylene	0.050 U							
Anthracene	0.050 U							
Benzo(a)anthracene	0.050 U							
Benzo(a)pyrene	0.050 U							
Benzo(b)fluoranthene	0.050 U							
Benzo(g,h,i)perylene	0.050 U							
Benzo(k)fluoranthene	0.050 U							
Chrysene	0.050 U	0.050 U	0.0051 J	0.050 U				
Dibenz(a,h)anthracene	0.050 U							
Fluoranthene	0.050 U							
Fluorene	0.050 U							
Indeno(1,2,3-cd)pyrene	0.050 U							
Naphthalene	0.006 J	0.0089 J	0.0094 J	0.011 J	0.014 J	0.0054 J	0.050 U	0.050 U
Phenanthrene	0.050 U	0.050 U	0.050 U	0.050 U	0.01 J	0.050 U	0.050 U	0.050 U
Pyrene	0.050 U							

Table 3-12. Method 8270-SIM Method Blank Analytical Results Summary Soil Samples (µg/Kg)

Analyte	QC Batch: 90848	QC Batch: 90937	QC Batch: 91011	QC Batch: 91078	QC Batch: 91094	QC Batch: 91116	QC Batch: 91118	QC Batch: 91120	QC Batch: 91318
2-Methylnaphthalene	16.7 U	16.7 U	16.7 U			16.7 U	16.7 U	16.7 U	7.7 J
Acenaphthene	16.7 U	3.2 J							
Acenaphthylene	16.7 U								
Anthracene	16.7 U								
Benzo(a)anthracene	16.7 U								
Benzo(a)pyrene	16.7 U								
Benzo(b)fluoranthene	16.7 U								
Benzo(g,h,i)perylene	16.7 U								
Benzo(k)fluoranthene	16.7 U								
Chrysene	16.7 U								
Dibenz(a,h)anthracene	16.7 U								
Fluoranthene	16.7 U								
Fluorene	16.7 U								
Indeno(1,2,3-cd)pyrene	16.7 U								
Naphthalene	16.7 U								
Phenanthrene	16.7 U	6.4 J							
Pyrene	16.7 U								

**Table 3-12. Method 8270-SIM Method Blank Analytical Results Summary
Soil Samples (µg/Kg) Continued 1**

Analyte	QC Batch: 91422	QC Batch: 91423	QC Batch: 91573	QC Batch: 91574	QC Batch: 91585	QC Batch: 91711	QC Batch: 91932	QC Batch: 92100	QC Batch: 92109
1-Methylnaphthalene								16.7 U	
2-Methylnaphthalene	16.7 U								
Acenaphthene	16.7 U								
Acenaphthylene	16.7 U								
Anthracene	16.7 U								
Benzo(a)anthracene	16.7 U								
Benzo(a)pyrene	16.7 U								
Benzo(b)fluoranthene	16.7 U								
Benzo(g,h,i)perylene	16.7 U								
Benzo(k)fluoranthene	16.7 U								
Chrysene	16.7 U								
Dibenz(a,h)anthracene	16.7 U								
Fluoranthene	16.7 U								
Fluorene	16.7 U								
Indeno(1,2,3-cd)pyrene	16.7 U								
Naphthalene	16.7 U								
Phenanthrene	16.7 U								
Pyrene	16.7 U								

**Table 3-12. Method 8270-SIM Method Blank Analytical Results Summary
Soil Samples (µg/Kg) Continued 2**

Analyte	QC Batch: 92111	QC Batch: 92220	QC Batch: 92305	QC Batch: 92409	QC Batch: 92410	QC Batch: 92510	QC Batch: 92511	QC Batch: 92626	QC Batch: 92892
2-Methylnaphthalene	16.7 U								
Acenaphthene	16.7 U								
Acenaphthylene	16.7 U								
Anthracene	16.7 U								
Benzo(a)anthracene	16.7 U								
Benzo(a)pyrene	16.7 U								
Benzo(b)fluoranthene	16.7 U								
Benzo(g,h,i)perylene	16.7 U								
Benzo(k)fluoranthene	16.7 U								
Chrysene	16.7 U								
Dibenz(a,h)anthracene	16.7 U								
Fluoranthene	16.7 U								
Fluorene	16.7 U								
Indeno(1,2,3-cd)pyrene	16.7 U								
Naphthalene	16.7 U								
Phenanthrene	16.7 U								
Pyrene	16.7 U								

Table 3-13. Surrogate Recoveries for Method 8270-SIM

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056201001	012312001	80	76
4056201002	012312002	80	75
4056201003	012312006	76	77
4056201004	012312009	72	71
4056201005	012312010	74	74
4056201006	012312012	77	60
4056201007	012312016	45	86
4056273001	012412034	71	150 S3
4056273002	012412083	54	135
4056273003	012412084	52	112
4056273004	012712150	62	82
4056282001	012412017	80	74
4056282002	012412018	81	78
4056282003	012412019	80	76
4056282004	012412020	80	77
4056282005	012412025	78	74
4056282006	012412026	78	73
4056282007	012412028	73	73
4056282008	012412029	80	80
4056282009	012412031	85	83
4056282010	012412032	81	76
4056282011	012412033	80	78
4056282012	012412049	85	76
4056282013	012412050	82	73
4056282014	012412051	72	66
4056282015	012412066	63	61
4056282016	012412067	58	58

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056282017	012412068	57	52
4056282018	012412069	83	82
4056282019	012412078	58	52
4056282020	012412079	65	67
4056282021	012412081	90	76
4056282022	012512085	90	85
4056282023	012512086	61	58
4056282024	012512087	82	78
4056282025	012512088	92	86
4056282026	012512103	89	83
4056282027	012512104	82	75
4056282028	012512105	85	78
4056282029	012512120	75	79
4056282030	012512121	61	71
4056282031	012512122	54	66
4056282032	012512124	59	55
4056282033	012512135	61	52
4056282034	012512136	76	54
4056308001	012512137	55	65
4056308002	012512138	56	69
4056308003	012512139	73	84
4056308004	012512147	65	74
4056308005	012512149	63	68
4056308006	012612151	64	73
4056308007	012612152	52	66
4056308008	012612153	65	75
4056308009	012612160	70	78
4056309001	012612161	81	84

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056309002	012612162	69	76
4056309003	012612163	72	67
4056309004	012612164	79	71
4056309005	012612165	70	69
4056309006	012612176	73	83
4056309007	012612177	68	83
4056309008	012612178	64	69
4056309009	012612187	65	67
4056309010	012612188	59	52
4056309011	012612189	55	65
4056309012	012612190	63	71
4056309013	012612191	66	70
4056309014	012712204	57	72
4056309015	012712205	71	80
4056309016	012712206	65	74
4056364001	013012280	69	81
4056364002	013012284	59	52
4056364003	013012285	59	59
4056364004	013012302	65	75
4056364005	013012303	64	77
4056364006	013012304	68	79
4056364007	013012305	65	73
4056364008	013012318	62	79
4056364009	013012319	67	73
4056364010	013012320	60	64
4056364011	013012330	75	54
4056364012	013012331	59	60
4056365001	013012255	32	74

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056365002	013112333	45	88
4056365003	020112334	33	87
4056369001	012712217	62	69
4056369002	012712218	59	66
4056369003	012712219	66	81
4056369004	012712225	60	54
4056369005	012712239	58	55
4056369006	012712226	76	74
4056369007	012712228	57	77
4056369008	012712229	59	63
4056369009	012712230	61	71
4056369010	012712231	69	65
4056369011	012712236	64	62
4056369012	012712240	63	75
4056369013	012712241	68	62
4056369014	012712242	70	66
4056369015	012712246	64	68
4056369016	012712252	0 S4	0 S4
4056369017	012712253	66	66
4056370001	013012256	50	67
4056370002	013012257	53	71
4056370003	013012258	47	57
4056370004	013012259	52	64
4056370005	013012287	55	66
4056370006	013012288	53	61
4056370007	013012289	64	70
4056370008	013012295	68	78
4056370009	013012299	76	64

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056370010	013012300	60	81
4056370011	013012272	59	74
4056370012	013012273	64	77
4056370013	013012274	79	79
4056464001	020212472	45	67
4056464002	020312491	52	71
4056465001	020112450	75	74
4056465002	020112451	64	59
4056465003	020112452	78	71
4056465004	020112465	67	62
4056465005	020112466	63	54
4056465006	020112467	77	72
4056465007	020112468	80	73
4056465008	020112469	59	53
4056465009	020112471	76	71
4056466001	013112397	85	82
4056466002	013112398	70	68
4056466003	013112399	79	75
4056466004	013112412	66	81
4056466005	013112413	59	72
4056466006	020112414	62	76
4056466007	020112415	63	77
4056466008	020112416	59	70
4056466009	020112417	60	73
4056466010	020112418	63	77
4056466011	020112419	68	72
4056466012	020112420	78	70
4056467001	013112335	86	83

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056467002	013112336	80	78
4056467003	013112337	82	76
4056467004	013112350	89	93
4056467005	013112351	86	87
4056467006	013112352	78	73
4056467007	013112363	61	55
4056467008	013112364	80	90
4056467009	013112365	82	74
4056467010	013112366	74	71
4056467011	013112367	85	82
4056467012	013112382	82	73
4056467013	013112383	86	85
4056467014	013112384	83	80
4056468001	020112433	89	90
4056468002	020112434	64	68
4056468003	020112435	85	80
4056468004	020112436	65	63
4056468005	020112437	73	77
4056468006	020112438	68	71
4056468007	020112439	81	79
4056468008	020112440	78	76
4056468009	020112473	80	88
4056468010	020112442	0 S4	0 S4
4056468011	020112445	0 S4	0 S4
4056468012	020112447	88	95
4056552001	020212474	52	57
4056552002	020212475	47	41
4056552003	020212476	56	56

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056552004	020212482	43	41
4056552005	020212490	63	57
4056552006	020212492	61	63
4056552007	020212493	43	45
4056552008	020212494	65	57
4056552009	020212509	59	63
4056552010	020212510	43	49
4056552011	020212511	71	65
4056552012	020212526	72	66
4056552013	020212527	81	71
4056553001	020212528	74	65
4056553002	020212540	81	73
4056553003	020212541	72	63
4056553004	020212558	69	66
4056553005	020212542	81	82
4056553006	020212543	68	63
4056553007	020212544	75	74
4056553008	020212545	74	63
4056631001	020312559	60	56
4056631002	020312560	66	63
4056631003	020312561	52	49
4056631004	020312568	57	56
4056631005	020312569	66	54
4056631006	020312576	66	58
4056631007	020312575	66	53
4056631008	020312577	68	67
4056631009	020312578	67	66
4056631010	020312579	60	55

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056631011	020312587	47	44
4056631012	020312591	61	57
4056631013	020312592	61	54
4056631014	020312594	62	60
4056631015	020312595	66	65
4056631016	020312596	46	45
4056631017	020312608	44	45
4056631018	020312609	59	53
4056631019	020312612	65	60
4056631020	020312613	74	77
4056631021	020312614	63	57
4056631022	020312627	47	42
4056631023	020312628	47	43
4056631024	020612629	70	64
4056631025	020612630	72	69
4056631026	020612631	64	56
4056631027	020612639	70	62
4056631028	020612641	66	57
4056631029	020612640	57	57
4056631030	020612643	67	58
4056631031	020612644	74	65
4056631032	020612645	53	45
4056631033	020612657	60	53
4056631034	020612658	65	63
4056631035	020612659	87	75
4056631036	020612660	81	69
4056631037	020612661	85	70
4056631038	020612662	81	73

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056631039	020612674	74	67
4056631040	020612675	78	77
4056631041	020612676	88	81
4056631042	020612677	80	70
4056631043	020612678	90	83
4056631044	020612683	66	58
4056631045	020612691	0 S4	0 S4
4056639001	020612611	58	69
4056639002	020712642	48	69
4056693001	020712693	82	74
4056693002	020712694	67	64
4056693003	020712706	86	82
4056693004	020712703	0 S4	0 S4
4056693005	020712704	65	62
4056693006	020712705	73	71
4056693007	020712707	82	73
4056693008	020712708	76	79
4056693009	020712709	80	78
4056693010	020712722	62	59
4056693011	020712723	50	48
4056725001	020812724	71	84
4056725002	020912771	44	72
4056725004	021012811	44	74
4056730001	020712725	78	78
4056730002	020712726	75	67
4056730003	020712727	64	56
4056730004	020712739	77	65
4056730005	020712740	78	64

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056730006	020712741	78	72
4056730007	020712742	69	66
4056730008	020712743	67	64
4056730009	020712751	68	63
4056730010	020712755	80	69
4056730011	020812759	64	55
4056730012	020812760	75	67
4056730013	020812761	76	72
4056730014	020812764	63	59
4056730015	020812770	59	53
4056730016	020812765	69	61
4056730017	020812769	65	57
4056730018	020812772	73	73
4056730019	020812773	0 S4	0 S4
4056730020	020812776	0 S4	0 S4
4056730021	020812777	58	78
4056730022	020812779	52	53
4056730023	020812780	65	61
4056730024	020812781	92	98
4056730025	020812790	59	54
4056730026	020812791	64	56
4056730027	020812794	68	60
4056730028	020812795	76	69
4056730029	020812796	71	65
4056730030	020812808	69	81
4056730031	020812809	57	51
4056766001	020912812	73	68
4056766002	020912813	70	66

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056766003	020912814	76	78
4056766004	020912822	86	80
4056766005	020912823	78	71
4056766006	020912824	67	59
4056766007	020912825	61	53
4056766008	020912826	58	53
4056766009	020912827	63	58
4056766010	020912835	58	52
4056766011	020912841	77	71
4056766012	020912842	61	53
4056766013	020912843	72	74
4056766014	020912844	47	43
4056766015	020912854	73	64
4056766016	020912855	77	69
4056766017	020912858	72	64
4056766018	020912861	57	58
4056766019	020912868	72	65
4056894001	021312869	60	74
4056898001	021012870	48	60
4056898002	021012871	76	79
4056898003	021012873	51	46
4056898004	021012882	68	72
4056898005	021012883	67	70
4056898006	021012884	85	87
4056898007	021012885	69	72
4056898008	021012886	70	65
4056898009	021012887	72	70
4056898010	021012888	79	77

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056898011	021012889	80	75
4056898012	021012890	75	65
4056898013	021012898	74	71
4056898014	021012901	69	67
4056898015	021012899	93	97
4056898016	021012902	77	76
4056898017	021012903	81	78
4056898018	021012904	75	75
4056898019	021012905	72	69
4056898020	021012918	72	68
4056898021	021012919	79	74
4056898022	021012915	69	87
4056898023	021012916	83	87
4056898024	021312920	93	95
4056898025	021312921	83	89
4056898026	021312922	83	85
4056898027	021312929	90	90
4056898028	021312933	66	70
4056898029	021312934	65	71
4056898030	021312935	75	95
4056898031	021312936	83	86
4056898032	021312937	55	63
4056898033	021312945	76	78
4056898034	021312946	81	81
4056898035	021312948	75	72
4056898036	021312949	79	69
4056898037	021312963	75	74
4056898038	021312950	76	76

Lab Sample Number	Field ID	2-Fluorobiphenyl	Terphenyl- <i>d</i> ₁₄
4056898039	021312958	71	63
4056898040	021312960	70	72
4056898041	021312961	89	93
4056898042	021312964	81	79
4056898043	021312965	75	75
4056898044	021312966	70	59
4056898045	021312971	71	70
4056898046	021312972	73	71
4056898047	021312973	87	97
4056898048	021312975	75	76
4056898049	021312976	80	89
4056898050	021312977	89	98
4056898051	021312981	66	62
4056898052	021312985	71	73
4056898053	021312987	71	67
4056898054	021312988	91	100

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary

Analyte	Recovery Limits (%)		QC Batch: 90848			QC Batch: 90937			QC Batch: 91011		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	45	130	333	244	73	333	174	52	333	219	66
Acenaphthene	51	130	333	298	89	333	193	58	333	241	72
Acenaphthylene	53	130	333	295	88	333	196	59	333	274	82
Anthracene	48	130	333	343	103	333	209	63	333	260	78
Benzo(a)anthracene	55	130	333	320	96	333	195	59	333	245	74
Benzo(a)pyrene	56	130	333	312	94	333	202	61	333	266	80
Benzo(b)fluoranthene	53	130	333	331	99	333	219	66	333	276	83
Benzo(g,h,i)perylene	58	130	333	329	99	333	195	59	333	236	71
Benzo(k)fluoranthene	55	130	333	324	97	333	171	51	333	260	78
Chrysene	59	130	333	331	99	333	196	59	333	253	76
Dibenz(a,h)anthracene	56	130	333	350	105	333	208	62	333	258	77
Fluoranthene	56	130	333	339	102	333	205	61	333	267	80
Fluorene	54	130	333	335	101	333	211	63	333	261	78
Indeno(1,2,3-cd)pyrene	57	130	333	351	105	333	206	62	333	250	75
Naphthalene	43	130	333	240	72	333	178	53	333	200	60
Phenanthrene	56	130	333	326	98	333	196	59	333	246	74
Pyrene	54	130	333	340	102	333	195	58	333	252	76

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 1

Analyte	Recovery Limits (%)		QC Batch: 90792			QC Batch: 90821			QC Batch: 90942		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2-Methylnaphthalene	29	130	.2	0.13	66	.2	0.16	78	.2	0.11	53
Acenaphthene	30	130	.2	0.12	61	.2	0.15	73	.2	0.094	47
Acenaphthylene	23	130	.2	0.12	59	.2	0.14	69	.2	0.096	48
Anthracene	20	130	.2	0.10	50	.2	0.13	63	.2	0.094	47
Benzo(a)anthracene	34	130	.2	0.14	70	.2	0.13	63	.2	0.12	59
Benzo(a)pyrene	41	130	.2	0.14	72	.2	0.15	73	.2	0.15	73
Benzo(b)fluoranthene	31	131	.2	0.15	74	.2	0.13	66	.2	0.13	63
Benzo(g,h,i)perylene	51	130	.2	0.17	84	.2	0.16	81	.2	0.15	73
Benzo(k)fluoranthene	56	130	.2	0.19	96	.2	0.20	99	.2	0.18	89
Chrysene	55	130	.2	0.18	91	.2	0.19	95	.2	0.17	86
Dibenz(a,h)anthracene	40	130	.2	0.17	84	.2	0.16	79	.2	0.14	69
Fluoranthene	38	130	.2	0.14	72	.2	0.15	77	.2	0.13	63
Fluorene	27	130	.2	0.12	61	.2	0.14	72	.2	0.10	50
Indeno(1,2,3-cd)pyrene	48	130	.2	0.17	84	.2	0.16	81	.2	0.14	71
Naphthalene	33	130	.2	0.12	60	.2	0.16	81	.2	0.12	59
Phenanthrene	28	130	.2	0.12	62	.2	0.14	70	.2	0.095	48
Pyrene	41	130	.2	0.14	70	.2	0.15	73	.2	0.13	63

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 2

Analyte	Recovery Limits (%)		QC Batch: 91078			QC Batch: 91094			QC Batch: 91116		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	45	130							333	200	60
Acenaphthene	51	130	333	249	75	333	284	85	333	238	71
Acenaphthylene	53	130	333	282	85	333	322	96	333	267	80
Anthracene	48	130	333	285	86	333	321	96	333	274	82
Benzo(a)anthracene	55	130	333	271	81	333	298	89	333	263	79
Benzo(a)pyrene	56	130	333	289	87	333	321	96	333	286	86
Benzo(b)fluoranthene	53	130	333	296	89	333	327	98	333	285	85
Benzo(g,h,i)perylene	58	130	333	268	80	333	290	87	333	285	86
Benzo(k)fluoranthene	55	130	333	286	86	333	319	96	333	275	82
Chrysene	59	130	333	273	82	333	301	90	333	263	79
Dibenz(a,h)anthracene	56	130	333	284	85	333	312	94	333	309	93
Fluoranthene	56	130	333	288	86	333	320	96	333	266	80
Fluorene	54	130	333	277	83	333	311	93	333	270	81
Indeno(1,2,3-cd)pyrene	57	130	333	279	84	333	308	92	333	307	92
Naphthalene	43	130	333	225	68	333	251	75	333	187	56
Phenanthrene	56	130	333	270	81	333	300	90	333	265	79
Pyrene	54	130	333	277	83	333	305	91	333	252	76

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 3

Analyte	Recovery Limits (%)		QC Batch: 91039			QC Batch: 91300			QC Batch: 91518		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2-Methylnaphthalene	29	130				.2	0.14	70	.2	0.10	51
Acenaphthene	30	130	.2	0.13	67	.2	0.13	64	.2	0.095	47
Acenaphthylene	23	130	.2	0.13	64	.2	0.13	64	.2	0.091	46
Anthracene	20	130	.2	0.12	60	.2	0.11	55	.2	0.089	44
Benzo(a)anthracene	34	130	.2	0.13	67	.2	0.12	62	.2	0.11	56
Benzo(a)pyrene	41	130	.2	0.14	71	.2	0.13	65	.2	0.12	62
Benzo(b)fluoranthene	31	131	.2	0.17	87	.2	0.15	76	.2	0.12	60
Benzo(g,h,i)perylene	51	130	.2	0.16	78	.2	0.14	71	.2	0.13	65
Benzo(k)fluoranthene	56	130	.2	0.16	82	.2	0.14	68	.2	0.14	68
Chrysene	55	130	.2	0.18	88	.2	0.15	76	.2	0.14	69
Dibenz(a,h)anthracene	40	130	.2	0.15	75	.2	0.14	70	.2	0.13	64
Fluoranthene	38	130	.2	0.15	76	.2	0.14	68	.2	0.11	57
Fluorene	27	130	.2	0.14	68	.2	0.13	65	.2	0.097	48
Indeno(1,2,3-cd)pyrene	48	130	.2	0.15	76	.2	0.14	69	.2	0.13	65
Naphthalene	33	130	.2	0.16	82	.2	0.13	67	.2	0.097	48
Phenanthrene	28	130	.2	0.14	68	.2	0.13	64	.2	0.097	49
Pyrene	41	130	.2	0.15	74	.2	0.14	68	.2	0.11	57

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 4

Analyte	Recovery Limits (%)		QC Batch: 91118			QC Batch: 91120			QC Batch: 91318		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	45	130	333	234	70	333	197	59	333	244	73
Acenaphthene	51	130	333	257	77	333	213	64	333	252	76
Acenaphthylene	53	130	333	290	87	333	244	73	333	256	77
Anthracene	48	130	333	281	84	333	230	69	333	294	88
Benzo(a)anthracene	55	130	333	274	82	333	227	68	333	264	79
Benzo(a)pyrene	56	130	333	287	86	333	236	71	333	275	82
Benzo(b)fluoranthene	53	130	333	289	87	333	232	70	333	282	85
Benzo(g,h,i)perylene	58	130	333	279	84	333	219	66	333	299	90
Benzo(k)fluoranthene	55	130	333	281	84	333	230	69	333	255	77
Chrysene	59	130	333	281	84	333	231	69	333	270	81
Dibenz(a,h)anthracene	56	130	333	310	93	333	243	73	333	304	91
Fluoranthene	56	130	333	273	82	333	221	66	333	269	81
Fluorene	54	130	333	281	84	333	233	70	333	260	78
Indeno(1,2,3-cd)pyrene	57	130	333	303	91	333	242	73	333	303	91
Naphthalene	43	130	333	230	69	333	187	56	333	235	71
Phenanthrene	56	130	333	269	81	333	221	66	333	260	78
Pyrene	54	130	333	265	80	333	216	65	333	275	82

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 5

Analyte	Recovery Limits (%)		QC Batch: 91792			QC Batch: 92044		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2-Methylnaphthalene	29	130	.2	0.15	73	.2	0.14	70
Acenaphthene	30	130	.2	0.14	69	.2	0.12	60
Acenaphthylene	23	130	.2	0.13	67	.2	0.12	60
Anthracene	20	130	.2	0.13	63	.2	0.12	58
Benzo(a)anthracene	34	130	.2	0.12	60	.2	0.12	60
Benzo(a)pyrene	41	130	.2	0.15	75	.2	0.13	66
Benzo(b)fluoranthene	31	131	.2	0.12	62	.2	0.13	63
Benzo(g,h,i)perylene	51	130	.2	0.15	74	.2	0.14	69
Benzo(k)fluoranthene	56	130	.2	0.19	93	.2	0.16	78
Chrysene	55	130	.2	0.19	97	.2	0.17	83
Dibenz(a,h)anthracene	40	130	.2	0.15	73	.2	0.14	70
Fluoranthene	38	130	.2	0.15	75	.2	0.14	68
Fluorene	27	130	.2	0.13	67	.2	0.12	62
Indeno(1,2,3-cd)pyrene	48	130	.2	0.15	74	.2	0.14	70
Naphthalene	33	130	.2	0.14	69	.2	0.13	66
Phenanthrene	28	130	.2	0.13	65	.2	0.12	58
Pyrene	41	130	.2	0.15	73	.2	0.13	65

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 6

Analyte	Recovery Limits (%)		QC Batch: 91422			QC Batch: 91423			QC Batch: 91573		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	45	130	333	269	81	333	282	85	333	212	64
Acenaphthene	51	130	333	295	88	333	308	92	333	230	69
Acenaphthylene	53	130	333	297	89	333	310	93	333	228	68
Anthracene	48	130	333	360	108	333	367	110	333	274	82
Benzo(a)anthracene	55	130	333	311	93	333	312	94	333	231	69
Benzo(a)pyrene	56	130	333	329	99	333	332	100	333	243	73
Benzo(b)fluoranthene	53	130	333	317	95	333	318	95	333	265	79
Benzo(g,h,i)perylene	58	130	333	282	85	333	319	96	333	250	75
Benzo(k)fluoranthene	55	130	333	339	102	333	332	100	333	233	70
Chrysene	59	130	333	328	98	333	329	99	333	249	75
Dibenz(a,h)anthracene	56	130	333	313	94	333	348	104	333	249	75
Fluoranthene	56	130	333	325	97	333	330	99	333	241	72
Fluorene	54	130	333	312	93	333	322	97	333	241	72
Indeno(1,2,3-cd)pyrene	57	130	333	301	90	333	341	102	333	253	76
Naphthalene	43	130	333	251	75	333	256	77	333	193	58
Phenanthrene	56	130	333	314	94	333	319	96	333	248	74
Pyrene	54	130	333	323	97	333	332	100	333	241	72

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 7

Analyte	Recovery Limits (%)		QC Batch: 91574			QC Batch: 91585			QC Batch: 91711		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	45	130	333	213	64	333	288	86	333	283	85
Acenaphthene	51	130	333	227	68	333	302	91	333	276	83
Acenaphthylene	53	130	333	232	70	333	305	91	333	282	85
Anthracene	48	130	333	264	79	333	349	105	333	312	94
Benzo(a)anthracene	55	130	333	227	68	333	293	88	333	266	80
Benzo(a)pyrene	56	130	333	232	69	333	298	89	333	280	84
Benzo(b)fluoranthene	53	130	333	253	76	333	286	86	333	322	96
Benzo(g,h,i)perylene	58	130	333	245	73	333	317	95	333	268	80
Benzo(k)fluoranthene	55	130	333	207	62	333	307	92	333	240	72
Chrysene	59	130	333	240	72	333	306	92	333	281	84
Dibenz(a,h)anthracene	56	130	333	246	74	333	319	96	333	270	81
Fluoranthene	56	130	333	246	74	333	316	95	333	284	85
Fluorene	54	130	333	235	70	333	306	92	333	280	84
Indeno(1,2,3-cd)pyrene	57	130	333	246	74	333	319	96	333	272	82
Naphthalene	43	130	333	211	63	333	286	86	333	282	85
Phenanthrene	56	130	333	236	71	333	306	92	333	280	84
Pyrene	54	130	333	234	70	333	300	90	333	266	80

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 8

Analyte	Recovery Limits (%)		QC Batch: 91932			QC Batch: 92100			QC Batch: 92109		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
1-Methylnaphthalene	44	130				333	212	64			
2-Methylnaphthalene	45	130	333	202	61	333	212	63	333	258	77
Acenaphthene	51	130	333	229	69	333	233	70	333	275	83
Acenaphthylene	53	130	333	229	69	333	234	70	333	275	83
Anthracene	48	130	333	267	80	333	268	80	333	320	96
Benzo(a)anthracene	55	130	333	233	70	333	237	71	333	273	82
Benzo(a)pyrene	56	130	333	238	71	333	240	72	333	284	85
Benzo(b)fluoranthene	53	130	333	222	66	333	246	74	333	272	82
Benzo(g,h,i)perylene	58	130	333	252	75	333	268	80	333	288	86
Benzo(k)fluoranthene	55	130	333	258	77	333	239	72	333	294	88
Chrysene	59	130	333	242	73	333	245	73	333	292	87
Dibenz(a,h)anthracene	56	130	333	246	74	333	275	82	333	289	87
Fluoranthene	56	130	333	237	71	333	245	73	333	286	86
Fluorene	54	130	333	236	71	333	239	72	333	278	83
Indeno(1,2,3-cd)pyrene	57	130	333	254	76	333	276	83	333	294	88
Naphthalene	43	130	333	165	49	333	188	57	333	237	71
Phenanthrene	56	130	333	239	72	333	238	71	333	281	84
Pyrene	54	130	333	235	70	333	243	73	333	281	84

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 9

Analyte	Recovery Limits (%)		QC Batch: 92111			QC Batch: 92220			QC Batch: 92305		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	45	130	333	249	75	333	211	63	333	223	67
Acenaphthene	51	130	333	269	81	333	245	73	333	240	72
Acenaphthylene	53	130	333	266	80	333	242	73	333	241	72
Anthracene	48	130	333	305	91	333	303	91	333	276	83
Benzo(a)anthracene	55	130	333	258	77	333	263	79	333	236	71
Benzo(a)pyrene	56	130	333	271	81	333	263	79	333	246	74
Benzo(b)fluoranthene	53	130	333	262	79	333	246	74	333	230	69
Benzo(g,h,i)perylene	58	130	333	264	79	333	284	85	333	245	73
Benzo(k)fluoranthene	55	130	333	279	84	333	263	79	333	274	82
Chrysene	59	130	333	274	82	333	278	83	333	247	74
Dibenz(a,h)anthracene	56	130	333	271	81	333	287	86	333	240	72
Fluoranthene	56	130	333	276	83	333	275	83	333	252	76
Fluorene	54	130	333	270	81	333	256	77	333	248	74
Indeno(1,2,3-cd)pyrene	57	130	333	271	81	333	284	85	333	245	73
Naphthalene	43	130	333	231	69	333	200	60	333	205	61
Phenanthrene	56	130	333	269	81	333	268	80	333	243	73
Pyrene	54	130	333	261	78	333	276	83	333	240	72

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 10

Analyte	Recovery Limits (%)		QC Batch: 92409			QC Batch: 92410			QC Batch: 92510		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	45	130	333	223	67	333	205	61	333	261	78
Acenaphthene	51	130	333	234	70	333	217	65	333	285	85
Acenaphthylene	53	130	333	238	71	333	216	65	333	286	86
Anthracene	48	130	333	273	82	333	244	73	333	328	99
Benzo(a)anthracene	55	130	333	231	69	333	215	65	333	286	86
Benzo(a)pyrene	56	130	333	231	69	333	217	65	333	281	84
Benzo(b)fluoranthene	53	130	333	228	68	333	244	73	333	332	100
Benzo(g,h,i)perylene	58	130	333	220	66	333	227	68	333	307	92
Benzo(k)fluoranthene	55	130	333	240	72	333	200	60	333	285	85
Chrysene	59	130	333	243	73	333	221	66	333	306	92
Dibenz(a,h)anthracene	56	130	333	222	67	333	226	68	333	315	95
Fluoranthene	56	130	333	240	72	333	225	67	333	295	88
Fluorene	54	130	333	243	73	333	223	67	333	294	88
Indeno(1,2,3-cd)pyrene	57	130	333	221	66	333	228	69	333	316	95
Naphthalene	43	130	333	210	63	333	189	57	333	248	74
Phenanthrene	56	130	333	250	75	333	218	65	333	294	88
Pyrene	54	130	333	261	78	333	227	68	333	291	87

Table 3-14. Method 8270-SIM Laboratory Control Sample Results Summary Continued 11

Analyte	Recovery Limits (%)		QC Batch: 92511			QC Batch: 92626			QC Batch: 92892		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	45	130	333	256	77	333	277	83	333	280	84
Acenaphthene	51	130	333	286	86	333	297	89	333	297	89
Acenaphthylene	53	130	333	287	86	333	300	90	333	301	90
Anthracene	48	130	333	331	99	333	344	103	333	342	103
Benzo(a)anthracene	55	130	333	288	87	333	294	88	333	288	86
Benzo(a)pyrene	56	130	333	298	89	333	315	95	333	305	92
Benzo(b)fluoranthene	53	130	333	338	101	333	351	105	333	321	96
Benzo(g,h,i)perylene	58	130	333	309	93	333	312	94	333	339	102
Benzo(k)fluoranthene	55	130	333	275	82	333	289	87	333	292	88
Chrysene	59	130	333	304	91	333	308	93	333	305	91
Dibenz(a,h)anthracene	56	130	333	312	94	333	307	92	333	336	101
Fluoranthene	56	130	333	295	88	333	315	95	333	315	95
Fluorene	54	130	333	294	88	333	302	91	333	301	90
Indeno(1,2,3-cd)pyrene	57	130	333	311	93	333	313	94	333	342	103
Naphthalene	43	130	333	234	70	333	268	81	333	265	80
Phenanthrene	56	130	333	291	87	333	299	90	333	299	90
Pyrene	54	130	333	283	85	333	304	91	333	297	89

Table 3-15. EPA 8270 by SIM MS/MSD Sample 012412031

Analyte	MS Sample ID: 012412031			MSD Sample ID: 012412031			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	5750	3830	57	5750	3420	50	11	543
Acenaphthene	5750	4550	69	5750	4030	60	12	589
Acenaphthylene	5750	5730	86	5750	4530	65	23	786
Anthracene	5750	6090	78	5750	5220	63	15	1630
Benzo(a)anthracene	5750	9700	89	5750	7730	54	23	4600
Benzo(a)pyrene	5750	11900	105	5750	9490	63	23	5870
Benzo(b)fluoranthene	5750	12000	108	5750	10100	73	18	5850
Benzo(g,h,i)perylene	5750	9310	93	5750	7140	55	26	3970
Benzo(k)fluoranthene	5750	10100	91	5750	7820	51	25	4870
Chrysene	5750	11200	93	5750	8750	50	25	5890
Dibenz(a,h)anthracene	5750	6210	85	5750	5130	66	19	1320
Fluoranthene	5750	19000	123	5750	15300	57	22	12000
Fluorene	5750	5120	77	5750	4470	66	14	698
Indeno(1,2,3-cd)pyrene	5750	8540	88	5750	7170	64	17	3480
Naphthalene	5750	4070	57	5750	3700	51	9	767
Phenanthrene	5750	10500	78	5750	9290	57	12	6020
Pyrene	5750	14900	96	5750	11100	29	29	9450 M1

Table 3-15. EPA 8270 by SIM MS/MSD Sample 012412078

Analyte	MS Sample ID: 012412078			MSD Sample ID: 012412078			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	4100	3500	62	4100	3070	51	13	971
Acenaphthene	4100	3120	62	4100	2640	50	17	576
Acenaphthylene	4100	3050	63	4100	2880	59	6	452
Anthracene	4100	3580	60	4100	3200	51	11	1100
Benzo(a)anthracene	4100	5400	73	4100	4680	56	14	2390
Benzo(a)pyrene	4100	5600	70	4100	5350	64	5	2720
Benzo(b)fluoranthene	4100	8590	130	4100	6750	85	24	3280
Benzo(g,h,i)perylene	4100	4240	63	4100	3910	55	8	1660
Benzo(k)fluoranthene	4100	3440	40	4100	3300	37	4	1800 L2, M0
Chrysene	4100	6250	83	4100	5260	59	17	2840
Dibenz(a,h)anthracene	4100	3410	67	4100	3010	58	12	657
Fluoranthene	4100	10700	120	4100	8500	67	23	5750
Fluorene	4100	3470	67	4100	3020	56	14	728
Indeno(1,2,3-cd)pyrene	4100	4290	69	4100	3700	55	15	1450
Naphthalene	4100	2910	57	4100	2510	48	15	558
Phenanthrene	4100	7880	89	4100	6530	56	19	4220
Pyrene	4100	8510	98	4100	6810	56	22	4490

Table 3-15. EPA 8270 by SIM MS/MSD Sample 012612191

Analyte	MS Sample ID: 012612191			MSD Sample ID: 012612191			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	3970	3520	66	3970	3330	61	6	903
Acenaphthene	3970	3590	66	3970	3500	64	3	958
Acenaphthylene	3970	3250	73	3970	3020	67	7	355 J
Anthracene	3970	4990	82	3970	5110	85	2	1740
Benzo(a)anthracene	3970	6600	75	3970	6240	66	6	3630
Benzo(a)pyrene	3970	6850	67	3970	6550	60	5	4170
Benzo(b)fluoranthene	3970	7870	89	3970	7590	81	4	4360
Benzo(g,h,i)perylene	3970	5680	74	3970	5460	68	4	2760
Benzo(k)fluoranthene	3970	5720	47	3970	5490	41	4	3860
Chrysene	3970	7680	76	3970	7340	68	5	4650
Dibenz(a,h)anthracene	3970	3570	65	3970	3460	63	3	972
Fluoranthene	3970	13500	64	3970	14600	91	8	11000
Fluorene	3970	3970	67	3970	3950	66	0.4	1320
Indeno(1,2,3-cd)pyrene	3970	5070	64	3970	4940	61	3	2530
Naphthalene	3970	3140	62	3970	2790	53	12	691
Phenanthrene	3970	9520	63	3970	10200	79	6	7030
Pyrene	3970	10500	65	3970	10200	57	3	7890

Table 3-15. EPA 8270 by SIM MS/MSD Sample 012712246

Analyte	MS Sample ID: 012712246			MSD Sample ID: 012712246			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
Acenaphthene	4470	3690	70	4470	3560	68	3	541
Acenaphthylene	4470	3850	82	4470	3860	82	0.3	203 J
Anthracene	4470	4130	71	4470	3960	67	4	970
Benzo(a)anthracene	4470	5430	64	4470	5130	57	6	2570
Benzo(a)pyrene	4470	6020	73	4470	5500	61	9	2780
Benzo(b)fluoranthene	4470	6240	70	4470	6680	80	7	3130
Benzo(g,h,i)perylene	4470	5020	72	4470	4560	62	10	1780
Benzo(k)fluoranthene	4470	5500	76	4470	4270	49	25	2100
Chrysene	4470	5840	61	4470	5680	58	3	3110
Dibenz(a,h)anthracene	4470	4060	75	4470	3850	70	5	698
Fluoranthene	4470	9850	61	4470	9030	43	9	7110
Fluorene	4470	3900	75	4470	3770	72	4	540
Indeno(1,2,3-cd)pyrene	4470	4920	76	4470	4470	66	10	1530
Naphthalene	4470	3450	66	4470	3270	62	5	525
Phenanthrene	4470	7140	66	4470	6300	47	12	4180
Pyrene	4470	7090	45	4470	7050	44	0.5	5080

Table 3-15. EPA 8270 by SIM MS/MSD Sample 013112363

Analyte	MS Sample ID: 013112363			MSD Sample ID: 013112363			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	3480	10800	142	3480	7560	50	35	5830 M1
Acenaphthene	3480	7000	107	3480	5350	59	27	3280
Acenaphthylene	3480	4200	90	3480	3750	77	11	1070
Anthracene	3480	6640	115	3480	5690	87	15	2640
Benzo(a)anthracene	3480	5300	94	3480	5140	89	3	2030
Benzo(a)pyrene	3480	6080	104	3480	5980	102	2	2450
Benzo(b)fluoranthene	3480	5510	103	3480	5580	105	1	1920
Benzo(g,h,i)perylene	3480	4500	85	3480	4540	86	0.7	1540
Benzo(k)fluoranthene	3480	4290	83	3480	3880	71	10	1400
Chrysene	3480	5880	100	3480	5610	92	5	2400
Dibenz(a,h)anthracene	3480	3150	78	3480	2640	64	17	420 J
Fluoranthene	3480	9420	135	3480	9400	135	0.2	4700 M1
Fluorene	3480	5190	96	3480	4290	70	19	1840
Indeno(1,2,3-cd)pyrene	3480	3870	81	3480	3760	78	3	1040
Naphthalene	3480	4140	84	3480	3040	52	31	1220
Phenanthrene	3480	13800	167	3480	12000	114	14	8000 M1
Pyrene	3480	9930	129	3480	9040	103	9	5440

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020112447

Analyte	MS Sample ID: 020112447			MSD Sample ID: 020112447			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	2410	3950	100	2410	3640	87	8	1540
Acenaphthene	2410	4680	115	2410	4170	93	12	1910
Acenaphthylene	2410	2190	83	2410	2200	84	0.7	184 J
Anthracene	2410	3650	113	2410	3360	101	8	919
Benzo(a)anthracene	2410	2740	85	2410	2660	82	3	675
Benzo(a)pyrene	2410	2910	87	2410	2980	90	3	812
Benzo(b)fluoranthene	2410	2700	96	2410	2800	100	4	386
Benzo(g,h,i)perylene	2410	2430	81	2410	2500	84	3	472
Benzo(k)fluoranthene	2410	2290	75	2410	2320	77	1	463
Chrysene	2410	2790	88	2410	2720	85	2	659
Dibenz(a,h)anthracene	2410	1980	78	2410	2070	82	4	90.2 J
Fluoranthene	2410	4160	109	2410	3880	98	7	1520
Fluorene	2410	3020	100	2410	2830	92	7	611
Indeno(1,2,3-cd)pyrene	2410	2230	80	2410	2290	83	3	296
Naphthalene	2410	12200	105	2410	12200	103	0.5	9680
Phenanthrene	2410	6660	154	2410	5570	109	18	2950 M1
Pyrene	2410	5060	121	2410	4530	99	11	2130

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020212511

Analyte	MS Sample ID: 020212511			MSD Sample ID: 020212511			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	4560	4830	80	4560	4770	79	1	1170
Acenaphthene	4560	4510	88	4560	4470	87	0.7	514
Acenaphthylene	4560	4330	88	4560	4330	88	0.08	310
Anthracene	4560	5790	103	4560	5810	103	0.4	1110
Benzo(a)anthracene	4560	6700	90	4560	7050	98	5	2580
Benzo(a)pyrene	4560	7190	96	4560	7340	99	2	2810
Benzo(b)fluoranthene	4560	7350	92	4560	9630	142	27	3170 M1
Benzo(g,h,i)perylene	4560	6100	89	4560	6070	88	0.5	2060
Benzo(k)fluoranthene	4560	6950	101	4560	7180	106	3	2330
Chrysene	4560	7860	93	4560	8300	103	5	3630
Dibenz(a,h)anthracene	4560	5060	96	4560	4870	92	4	700
Fluoranthene	4560	12400	108	4560	13300	129	7	7470
Fluorene	4560	4740	90	4560	4700	89	0.8	643
Indeno(1,2,3-cd)pyrene	4560	5710	91	4560	5700	90	0.2	1580
Naphthalene	4560	4300	78	4560	4180	76	3	741
Phenanthrene	4560	8680	95	4560	9260	108	6	4340
Pyrene	4560	9590	87	4560	10400	104	8	5620

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020212474

Analyte	MS Sample ID: 020212474			MSD Sample ID: 020212474			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	736	480	24	736	479	24	0.1	304 M1
Acenaphthene	736	622	30	736	597	27	4	399 M1
Acenaphthylene	736	650	17	736	624	13	4	525 M1
Anthracene	736	913	-43	736	908	-44	0.6	1230 M1
Benzo(a)anthracene	736	1370	-302	736	1350	-305	2	3590 M1
Benzo(a)pyrene	736	1630	-372	736	1620	-373	0.3	4370 M1
Benzo(b)fluoranthene	736	1520	-451	736	1970	-391	26	4850 M1
Benzo(g,h,i)perylene	736	1300	-247	736	1310	-246	0.9	3120 M1
Benzo(k)fluoranthene	736	1500	-221	736	1120	-272	29	3120 M1
Chrysene	736	1640	-401	736	1560	-413	5	4600 M1
Dibenz(a,h)anthracene	736	852	-37	736	927	-27	8	1120 M1
Fluoranthene	736	3100	-836	736	3180	-826	3	9260 M1
Fluorene	736	694	31	736	674	28	3	467 M1
Indeno(1,2,3-cd)pyrene	736	1220	-195	736	1210	-196	0.7	2650 M1
Naphthalene	736	425	-2	736	481	6	12	440 M1
Phenanthrene	736	1680	-364	736	1770	-351	5	4360 M1
Pyrene	736	2200	-618	736	2250	-611	2	6750 M1

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020312591

Analyte	MS Sample ID: 020312591			MSD Sample ID: 020312591			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	3890	21600	36	3890	20500	9	5	20200 M1
Acenaphthene	3890	9990	54	3890	9550	42	4	7900
Acenaphthylene	3890	9850	166	3890	6680	85	38	3360 M1
Anthracene	3890	15500	104	3890	14300	73	8	11500
Benzo(a)anthracene	3890	17100	122	3890	16000	94	7	12300
Benzo(a)pyrene	3890	14800	108	3890	14700	105	0.8	10600
Benzo(b)fluoranthene	3890	11300	96	3890	15200	194	29	7620 M1
Benzo(g,h,i)perylene	3890	8310	69	3890	8550	75	3	5630
Benzo(k)fluoranthene	3890	11700	62	3890	8790	-14	29	9330 M1
Chrysene	3890	19800	129	3890	18800	103	5	14700
Dibenz(a,h)anthracene	3890	4550	64	3890	4380	60	4	2040
Fluoranthene	3890	31800	82	3890	32300	96	2	28600
Fluorene	3890	11100	95	3890	9640	57	14	7400
Indeno(1,2,3-cd)pyrene	3890	6940	58	3890	7190	65	3	4670
Naphthalene	3890	20200	55	3890	19700	42	3	18100
Phenanthrene	3890	35600	42	3890	36300	60	2	33900
Pyrene	3890	30900	126	3890	30500	117	1	26000

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020612657

Analyte	MS Sample ID: 020612657			MSD Sample ID: 020612657			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	3680	7210	37	3680	12300	176	52	5850 M1
Acenaphthene	3680	5140	59	3680	8030	137	44	2990 M1
Acenaphthylene	3680	2790	24	3680	4160	61	39	1910 M1
Anthracene	3680	4840	15	3680	8260	109	52	4270 M1
Benzo(a)anthracene	3680	3960	-20	3680	7730	82	64	4720 M1
Benzo(a)pyrene	3680	3790	-17	3680	7250	78	63	4400 M1
Benzo(b)fluoranthene	3680	3540	9	3680	6380	86	57	3210 M1
Benzo(g,h,i)perylene	3680	2890	19	3680	5010	77	54	2200
Benzo(k)fluoranthene	3680	3110	5	3680	6090	86	65	2920 M1
Chrysene	3680	4480	-28	3680	9240	102	69	5500 M1
Dibenz(a,h)anthracene	3680	2090	34	3680	3320	67	45	857
Fluoranthene	3680	7470	-23	3680	15500	196	70	8320 M1
Fluorene	3680	3790	46	3680	6170	111	48	2090
Indeno(1,2,3-cd)pyrene	3680	2610	21	3680	4490	72	53	1830
Naphthalene	3680	11300	126	3680	18500	322	49	6650 M1
Phenanthrene	3680	9460	-16	3680	19100	247	68	10000 M1
Pyrene	3680	6940	-23	3680	13800	165	66	7790 M1

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020712722

Analyte	MS Sample ID: 020712722			MSD Sample ID: 020712722			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	3480	37700	-239	3480	36400	-276	4	46000 M6
Acenaphthene	3480	33200	-326	3480	29400	-436	12	44500 M6
Acenaphthylene	3480	3820 J	34	3480	5330	78		2630 JM6
Anthracene	3480	18500	-311	3480	16500	-368	11	29300 M6
Benzo(a)anthracene	3480	9020	-63	3480	9700	-44	7	11200 M6
Benzo(a)pyrene	3480	7740 J	-87	3480	8260	-72		10800 M6
Benzo(b)fluoranthene	3480	5260 J	-40	3480	6340	-9		6630 JM6
Benzo(g,h,i)perylene	3480	4730 J	-12	3480	5240	3		5140 JM6
Benzo(k)fluoranthene	3480	4750 J	-26	3480	6050	11		5650 JM6
Chrysene	3480	9000	-67	3480	9880	-41	9	11300 M6
Dibenz(a,h)anthracene	3480	2540 J	41	3480	3160	59		8690 U
Fluoranthene	3480	17100	-220	3480	17700	-202	4	24800 M6
Fluorene	3480	13200	-116	3480	12600	-134	5	17200 M6
Indeno(1,2,3-cd)pyrene	3480	3790 J	6	3480	4350	22		3580 JM6
Naphthalene	3480	133000	-338	3480	128000	-470	4	145000 M6
Phenanthrene	3480	39700	-564	3480	36600	-653	8	59300 M6
Pyrene	3480	21100	-343	3480	21100	-344	0.1	33000 M6

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020612658

Analyte	MS Sample ID: 020612658			MSD Sample ID: 020612658			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
1-Methylnaphthalene	396	1300	-227	396	1680	-132	25	16400
2-Methylnaphthalene	396	1650	-277	396	2090	-167	23	23800
Acenaphthene	396	311 J	48	396	420	75		26700
Acenaphthylene	396	691 J	-37	396	872	9		2270 J
Anthracene	396	340 J	86	396	510	129		19800
Benzo(a)anthracene	396	361 J	91	396	453	114		10500
Benzo(a)pyrene	396	250 J	63	396	314	79		10300
Benzo(b)fluoranthene	396	248 J	63	396	297	75		6370
Benzo(g,h,i)perylene	396	244 J	62	396	283	71		5450
Benzo(k)fluoranthene	396	251 J	63	396	292	74		5680
Chrysene	396	301 J	76	396	442	112		11300
Dibenz(a,h)anthracene	396	990 U	58	396	246	62		1340 J
Fluoranthene	396	990 U	74	396	466	118		23600
Fluorene	396	353 J	42	396	573	98		11700
Indeno(1,2,3-cd)pyrene	396	237 J	60	396	259	65		3800
Naphthalene	396	11700	-2570	396	26300	1120	77	41500
Phenanthrene	396	454 J	13	396	994	149		49500
Pyrene	396	320 J	43	396	551	101		31700

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020812776

Analyte	MS Sample ID: 020812776			MSD Sample ID: 020812776			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	3710	124000	742	3710	176000	2140	35	96200 M6
Acenaphthene	3710	127000	709	3710	192000	2460	41	101000 M6
Acenaphthylene	3710	9370 J	125	3710	12400	207		4750 JM6
Anthracene	3710	64700	335	3710	94800	1150	38	52300 M6
Benzo(a)anthracene	3710	31500	234	3710	41900	514	28	22800 M6
Benzo(a)pyrene	3710	29200	232	3710	39900	520	31	20600 M6
Benzo(b)fluoranthene	3710	17000	82	3710	23900	267	34	14000 JM6
Benzo(g,h,i)perylene	3710	16400	166	3710	22900	342	33	10200 JM6
Benzo(k)fluoranthene	3710	17400	264	3710	21800	383	23	7560 JM6
Chrysene	3710	31600	236	3710	41300	496	26	22900 M6
Dibenz(a,h)anthracene	3710	4850 J	70	3710	6510	115		14800 U
Fluoranthene	3710	70000	430	3710	96700	1150	32	54100 M6
Fluorene	3710	48600	294	3710	71600	913	38	37700 M6
Indeno(1,2,3-cd)pyrene	3710	11600 J	144	3710	16000	261		6280 JM6
Naphthalene	3710	472000	2880	3710	647000	7620	31	365000 M6
Phenanthrene	3710	167000	919	3710	239000	2850	35	133000 M6
Pyrene	3710	85100	280	3710	117000	1140	32	74700 M6

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020912868

Analyte	MS Sample ID: 020912868			MSD Sample ID: 020912868			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	2420	1780	71	2420	1790	72	0.5	56.9 J
Acenaphthene	2420	1950	78	2420	1930	77	1	74.1 J
Acenaphthylene	2420	1770	73	2420	1890	78	6	121 U
Anthracene	2420	2170	86	2420	2260	90	4	85.0 J
Benzo(a)anthracene	2420	1900	75	2420	1880	74	1	80.8 J
Benzo(a)pyrene	2420	1980	79	2420	1940	77	2	72.4 J
Benzo(b)fluoranthene	2420	2020	82	2420	2100	85	4	47.9 J
Benzo(g,h,i)perylene	2420	1840	74	2420	1890	76	3	43.9 J
Benzo(k)fluoranthene	2420	1690	68	2420	1680	68	0.5	46.5 J
Chrysene	2420	1930	76	2420	1970	78	2	88.9 J
Dibenz(a,h)anthracene	2420	1730	72	2420	1830	76	6	121 U
Fluoranthene	2420	2350	91	2420	2160	83	8	156
Fluorene	2420	1870	76	2420	1950	79	4	40.9 J
Indeno(1,2,3-cd)pyrene	2420	1770	72	2420	1870	77	6	23.3 J
Naphthalene	2420	1800	70	2420	1700	66	6	101 J
Phenanthrene	2420	2510	94	2420	2260	83	11	247
Pyrene	2420	2140	80	2420	2010	75	6	205

Table 3-15. EPA 8270 by SIM MS/MSD Sample 020312613

Analyte	MS Sample ID: 020312613			MSD Sample ID: 020312613			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	4340	4380	80	4340	4090	73	7	915 H2
Acenaphthene	4340	3960	79	4340	3300	64	18	522 H2
Acenaphthylene	4340	4090	81	4340	3310	63	21	569 H2
Anthracene	4340	5640	100	4340	4770	80	17	1310 H2
Benzo(a)anthracene	4340	8990	120	4340	7040	75	24	3770 H2
Benzo(a)pyrene	4340	10100	142	4340	7710	86	27	3990 H2, M1
Benzo(b)fluoranthene	4340	11100	173	4340	7770	97	35	3570 H2, M1
Benzo(g,h,i)perylene	4340	8500	138	4340	6410	90	28	2500 H2
Benzo(k)fluoranthene	4340	8550	117	4340	6710	74	24	3490 H2
Chrysene	4340	9650	110	4340	7650	64	23	4860 H2
Dibenz(a,h)anthracene	4340	5870	115	4340	4640	87	23	862 H2
Fluoranthene	4340	12000	114	4340	9630	59	22	7070 H2
Fluorene	4340	4270	80	4340	3710	67	14	810 H2
Indeno(1,2,3-cd)pyrene	4340	7970	131	4340	6030	86	28	2280 H2
Naphthalene	4340	3610	67	4340	3450	63	4	711 1q, H2
Phenanthrene	4340	10600	120	4340	8670	75	20	5400 H2
Pyrene	4340	14200	154	4340	10800	78	26	7480 H2, M1

Table 3-15. EPA 8270 by SIM MS/MSD Sample 021012887

Analyte	MS Sample ID: 021012887			MSD Sample ID: 021012887			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	4450	4560	70	4450	4420	66	3	1470
Acenaphthene	4450	4360	69	4450	4280	67	2	1300
Acenaphthylene	4450	4390	68	4450	4470	70	2	1370
Anthracene	4450	6730	83	4450	6060	68	11	3050
Benzo(a)anthracene	4450	8620	82	4450	7020	46	20	4970
Benzo(a)pyrene	4450	8500	71	4450	7090	39	18	5350 M1
Benzo(b)fluoranthene	4450	11100	115	4450	7340	30	41	5990 M1
Benzo(g,h,i)perylene	4450	7320	75	4450	6380	54	14	3970
Benzo(k)fluoranthene	4450	6650	55	4450	6640	55	0.2	4210
Chrysene	4450	11300	95	4450	8730	38	25	7030
Dibenz(a,h)anthracene	4450	4530	78	4450	4480	77	1	1060
Fluoranthene	4450	23000	143	4450	16300	-8	34	16700 M1
Fluorene	4450	4530	65	4450	4440	63	2	1640
Indeno(1,2,3-cd)pyrene	4450	6160	67	4450	5660	56	8	3170
Naphthalene	4450	5270	75	4450	4830	66	9	1910
Phenanthrene	4450	13600	92	4450	10400	20	27	9500 M1
Pyrene	4450	15200	102	4450	11500	19	28	10600 M1

Table 3-15. EPA 8270 by SIM MS/MSD Sample 021312921

Analyte	MS Sample ID: 021312921			MSD Sample ID: 021312921			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	4840	3540	67	4840	3210	60	10	315 J
Acenaphthene	4840	4230	77	4840	3790	68	11	508
Acenaphthylene	4840	4250	75	4840	4040	71	5	611
Anthracene	4840	5540	80	4840	5520	80	0.4	1650
Benzo(a)anthracene	4840	6520	61	4840	7000	71	7	3550
Benzo(a)pyrene	4840	7010	63	4840	8090	85	14	3980
Benzo(b)fluoranthene	4840	7090	49	4840	8770	83	21	4740
Benzo(g,h,i)perylene	4840	5960	64	4840	6340	72	6	2870
Benzo(k)fluoranthene	4840	6570	78	4840	6650	79	1	2810
Chrysene	4840	7900	66	4840	8560	80	8	4690
Dibenz(a,h)anthracene	4840	4770	80	4840	4820	81	1	910
Fluoranthene	4840	13800	59	4840	15000	84	8	10900
Fluorene	4840	4370	77	4840	3850	66	13	650
Indeno(1,2,3-cd)pyrene	4840	5650	69	4840	5870	73	4	2330
Naphthalene	4840	3440	65	4840	3330	62	3	308 J
Phenanthrene	4840	8760	66	4840	8680	65	0.9	5550
Pyrene	4840	9930	47	4840	10700	63	8	7630

Table 3-15. EPA 8270 by SIM MS/MSD Sample 021312946

Analyte	MS Sample ID: 021312946			MSD Sample ID: 021312946			RPD	Lab Sample Result (µg/Kg)
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)		
2-Methylnaphthalene	2510	2700	43	2510	3170	61	16	1630
Acenaphthene	2510	3030	42	2510	3530	62	15	1970
Acenaphthylene	2510	2250	83	2510	2230	83	0.8	162
Anthracene	2510	2930	55	2510	3220	67	9	1540
Benzo(a)anthracene	2510	2360	70	2510	2350	70	0.04	597
Benzo(a)pyrene	2510	2400	76	2510	2390	76	0.4	488
Benzo(b)fluoranthene	2510	2200	75	2510	2100	71	5	314
Benzo(g,h,i)perylene	2510	2280	82	2510	2240	80	2	229
Benzo(k)fluoranthene	2510	2220	79	2510	2240	80	0.8	236
Chrysene	2510	2410	71	2510	2430	72	0.9	635
Dibenz(a,h)anthracene	2510	2080	80	2510	2040	79	2	68.1 J
Fluoranthene	2510	2820	59	2510	2950	64	5	1350
Fluorene	2510	2610	59	2510	2770	65	6	1130
Indeno(1,2,3-cd)pyrene	2510	2140	79	2510	2110	78	2	160
Naphthalene	2510	4060	-78	2510	6990	38	53	6030 M1
Phenanthrene	2510	3920	-16	2510	4620	12	16	4320 M1
Pyrene	2510	2900	41	2510	3150	51	8	1860

Table 3-16. 8270-SIM Field Duplicate Analytical Results Summary

Analyte	Sample ID: 012412017		Sample ID: 012412018		RPD	Sample ID: 012512087		Sample ID: 012512088		RPD	Sample ID: 012712225		Sample ID: 012712239		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2-Methylnaphthalene	230	J	196	J	16	224	J	330		38	14000		11700		18
Acenaphthene	283		210	J	30	234	J	346		39	9700		7780		22
Acenaphthylene	318		284		11	335		472		34	3050		1100		94
Anthracene	751		595		23	698		932		29	8000		6200		25
Benzo(a)anthracene	2370		1890		23	2260		3070		30	9630		7230		28
Benzo(a)pyrene	2900		2310		23	2860		3960		32	12300		7220		52
Benzo(b)fluoranthene	2790		2400		15	3360		4130		21	9420		6210		41
Benzo(g,h,i)perylene	2020		1720		16	2010		2700		29	6770		4210		47
Benzo(k)fluoranthene	2650		2150		21	2450	L2	3280	L2	29	7000		5210		29
Chrysene	3040		2430		22	2990		3990		29	10200		7710		28
Dibenz(a,h)anthracene	734		592		21	717		970		30	2230		1370		48
Fluoranthene	6420		4940		26	6590		8110		21	20000		17000		16
Fluorene	342		262	J	26	341		418		20	5970		4940		19
Indeno(1,2,3-cd)pyrene	1780		1500		17	1740		2440		33	5400		3230		50
Naphthalene	263	J	192	J	31	248	J	376		41	9290		7620		20
Phenanthrene	2790		2180		25	2890		3600		22	26500		21700		20
Pyrene	4790		3660		27	4750		6210		27	17800		14800		18

Table 3-16. 8270-SIM Field Duplicate Analytical Results Summary Continued 1

Analyte	Sample ID: 013012257		Sample ID: 013012258		RPD	Sample ID: 013012302		Sample ID: 013012303		RPD	Sample ID: 020112436		Sample ID: 020112437		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2-Methylnaphthalene	102	J	77.2	J	28						167	JB	206	JB	21
Acenaphthene	119	J	110	J	8	248		173	J	36	223	JB	310	B	33
Acenaphthylene	102	J	76.8	J	28	175	J	113	J	43	225	J	407		58
Anthracene	250	J	229	J	9	620		412		40	719		1210		51
Benzo(a)anthracene	782		703		11	2150		1320		48	1940		3230		50
Benzo(a)pyrene	1050		888		17	2540		1630		44	2360		3500		39
Benzo(b)fluoranthene	1220		1110		9	2640		2010		27	2520		4530		57
Benzo(g,h,i)perylene	737		659		11	1860		1100		51	1400		1900		30
Benzo(k)fluoranthene	798		684		15	2420		1300		60	2200		2600		17
Chrysene	1050		953		10	2880		1840		44	2670		4120		43
Dibenz(a,h)anthracene	288		234	J	21	626		446		34	522		717		31
Fluoranthene	2040		1890		8	5730		4100		33	5130		9120		56
Fluorene	151	J	137	J	10	362		247	J	38	287		389		30
Indeno(1,2,3-cd)pyrene	622		572		8	1610		935		53	1290		1820		34
Naphthalene	287		181	J	45	270		210	J	25	244		278		13
Phenanthrene	971		932		4	2620		1830		36	2510	B	3790	B	41
Pyrene	1720		1430		18	4460		3040		38	3810		6370		50

Table 3-16. 8270-SIM Field Duplicate Analytical Results Summary Continued 2

Analyte	Sample ID: 020112469		Sample ID: 020112471		RPD	Sample ID: 020212541		Sample ID: 020212558		RPD	Sample ID: 020312569		Sample ID: 020312576		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2-Methylnaphthalene	252		393	J	44	41700		43300		4	3730		9700		89
Acenaphthene	267		436	J	48	34900		36100		3	1580		4090		89
Acenaphthylene	176	J	324	J	59	6140		6300		3	458		1100		82
Anthracene	790		1210		42	25600		25300		1	2620		6300		83
Benzo(a)anthracene	1880		3020		47	17100		16400		4	3030		7520		85
Benzo(a)pyrene	2040		3400		50	16000		16100		1	2580		6240		83
Benzo(b)fluoranthene	2010		3730		60	9470		9290		2	3070		6680		74
Benzo(g,h,i)perylene	1500		2370		45	8790		7980		10	1560		3680		81
Benzo(k)fluoranthene	2070		2900		33	9380		10400		10	1930		5050		89
Chrysene	2590		4080		45	19800		18300		8	4220		10100		82
Dibenz(a,h)anthracene	467		815		54	2860	J	2380	J	18	569		1230		73
Fluoranthene	5330		8440		45	36500		34400		6	8810		20900		81
Fluorene	330		472	J	35	16400		16700		2	1510		3880		88
Indeno(1,2,3-cd)pyrene	1230		2020		49	6380		6040		5	1270		3030		82
Naphthalene	263		381	J	37	38900		39800		2	3990		9160		79
Phenanthrene	2870		4260		39	67200		66100		2	8460		19900		81
Pyrene	4100		6670		48	40700		41600		2	7000		16700		82

Table 3-16. 8270-SIM Field Duplicate Analytical Results Summary Continued 3

Analyte	Sample ID: 020612639		Sample ID: 020612641		RPD	Sample ID: 020712694		Sample ID: 020712706		RPD	Sample ID: 020812764		Sample ID: 020812770		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2-Methylnaphthalene	30300		22700		29	700		888		24	14200		11500		21
Acenaphthene	9550		5770		49	706		1100		44	4540		4080		11
Acenaphthylene	4220		2590		48	361		349		3	2080		1170		56
Anthracene	13100		7090		60	2220		1720		25	6110		4730		25
Benzo(a)anthracene	11800		6090		64	1730		2120		20	5630		4030		33
Benzo(a)pyrene	10200		5350		62	1840		2050		11	5020		3280		42
Benzo(b)fluoranthene	7990		3750		72	1490		2190		38	4310		2670		47
Benzo(g,h,i)perylene	4980		2580		63	1240		1360		9	2980		1810		49
Benzo(k)fluoranthene	6330		3940		47	1590		1580		1	2770		2310		18
Chrysene	13400		6940		64	2220		2640		17	6760		4640		37
Dibenz(a,h)anthracene	1590	J	945	J	51	419		444		6	919	J	711		26
Fluoranthene	24700		12500		66	4830		6460		29	13600		9420		36
Fluorene	8740		5320		49	549		776		34	4470		3550		23
Indeno(1,2,3-cd)pyrene	3660	J	2010		58	946		1070		12	2270		1230		59
Naphthalene	34000		29400		15	917		1100		18	16100		13400		18
Phenanthrene	41100		20900		65	3440		4380		24	18400		14700		22
Pyrene	27400		12300		76	3510		4490		25	13800		8550		47

Table 3-16. 8270-SIM Field Duplicate Analytical Results Summary Continued 4

Analyte	Sample ID: 020912823		Sample ID: 020912824		RPD	Sample ID: 021012882		Sample ID: 021012883		RPD	Sample ID: 021012898		Sample ID: 021012901		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2-Methylnaphthalene	1880		2470		27	66.4		34.6		63	7290		7650		5
Acenaphthene	2590		3310		24	77.1		24.4		104	3510		3890		10
Acenaphthylene	647		730		12	15.6 J		4.6 J		109	1820		2500		31
Anthracene	2860		3660		25	77.1		21.2		114	5030		6000		18
Benzo(a)anthracene	2870		3660		24	44.5		14.5 J		102	5910		7260		21
Benzo(a)pyrene	3480		3820		9	51.3		13.0 J		119	5120		6800		28
Benzo(b)fluoranthene	2370		2850		18	36.1		9.9 J		114	4720		6170		27
Benzo(g,h,i)perylene	2180		2430		11	33.9		7.8 J		125	2810		3870		32
Benzo(k)fluoranthene	2040		2540		22	24.6		6.3 J		118	4070		4980		20
Chrysene	3300		4260		25	50.7		15.7 J		105	7550		9210		20
Dibenz(a,h)anthracene	561		721		25	8.2 J		5.4 U		NC	1010		1340		28
Fluoranthene	7380		9460		25	94.3		27.1		111	15400		19300		22
Fluorene	1500		1880		22	37.7		12.0 J		103	3030		3450		13
Indeno(1,2,3-cd)pyrene	1530		1830		18	21.0		4.4 J		131	2330		3120		29
Naphthalene	4400		5620		24	135		78.0		54	6040		6420		6
Phenanthrene	8220		10900		28	196		68.1		97	14400		16500		14
Pyrene	6990		9040		26	113		35.4		105	11900		14200		18

Table 3-16. 8270-SIM Field Duplicate Analytical Results Summary Continued 5

Analyte	Sample ID: 021312949		Sample ID: 021312963		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
2-Methylnaphthalene	374	J	231	J	47
Acenaphthene	562	J	383		38
Acenaphthylene	514	J	439		16
Anthracene	1420		1060		29
Benzo(a)anthracene	3870		2770		33
Benzo(a)pyrene	4490		3410		27
Benzo(b)fluoranthene	4850		3110		44
Benzo(g,h,i)perylene	3300		2370		33
Benzo(k)fluoranthene	3710		3160		16
Chrysene	5250		3650		36
Dibenz(a,h)anthracene	912		749		20
Fluoranthene	10400		8050		25
Fluorene	627	J	436		36
Indeno(1,2,3-cd)pyrene	2810		1990		34
Naphthalene	723	J	379		62
Phenanthrene	5520		3240		52
Pyrene	7030		5310		28

Table 3-17. Alkylated PAH by SIM Method Blank Analytical Results Summary

Soil Samples (µg/Kg)

Analyte	QC Batch: 197689	QC Batch: 197721	QC Batch: 198276	QC Batch: 198358	QC Batch: 198532	QC Batch: 198863	QC Batch: 198875
Benzo(e)pyrene	10.0 U						
C1-Chrysenes	10.0 U						
C1-Fluoranthenes/Pyrenes	10.0 U						
C1-Fluorenes	10.0 U						
C1-Naphthalenes	10.0 U						
C1-Phenanthrenes/Anthracenes	10.0 U						
C2-Chrysenes	10.0 U						
C2-Fluorenes	10.0 U						
C2-Naphthalenes	10.0 U						
C2-Phenanthrenes/Anthracenes	10.0 U						
C3-Chrysenes	10.0 U						
C3-Fluorenes	10.0 U						
C3-Naphthalenes	10.0 U						
C3-Phenanthrenes/Anthracenes	10.0 U						
C4-Chrysenes	10.0 U						
C4-Naphthalenes	10.0 U						
C4-Phenanthrenes/Anthracenes	10.0 U						
Perylene	10.0 U						

Table 3-18. Alkylated PAH by SIM Laboratory Control Sample Analytical Results Summary

Analyte	Recovery Limits (%)		QC Batch: 197689			QC Batch: 197721			QC Batch: 198276		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Benzo(e)pyrene	50	125	33.3	21.0	63	25	18.2	73	25	18.7	75
Perylene	50	125	33.3	17.4	52	25	16.4	65	25	16.9	68

Table 3-18. Alkylated PAH by SIM Laboratory Control Sample Analytical Results Summary Continued 1

Analyte	Recovery Limits (%)		Spike (µg/Kg)	QC Batch: 198358		QC Batch: 198532		QC Batch: 198863		QC Batch: 198875	
	Lower	Upper		Result (µg/Kg)	Recovery (%)						
Benzo(e)pyrene	50	125	25	19.8	79	20.0	80	19.5	78	17.8	71
Perylene	50	125	25	17.6	70	16.6	66	16.5	66	15.5	62

Table 3-19. Alkylated PAH by SIM MS/MSD Analytical Results Summary

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
012312001	Benzo(e)pyrene	443	5610	-272	443	5960	-190	6	6810 M1, N2
	Perylene	443	1530	47	443	1650	74	8	1320 M1, N2
012412031	Benzo(e)pyrene	359	4690	-236	359	4610	-263	2	5540 M1, N2
	Perylene	359	1350	44	359	1340	41	0.9	1200 M1, N2
020212474	Benzo(e)pyrene	276	4230	-613	276	4670	-451	10	5920 M1, N2
	Perylene	276	1290	-36	276	1500	40	15	1390 M1, N2
020312591	Benzo(e)pyrene	243	14400	-340	243	10100	-2120	35	15200 M6, N2
	Perylene	243	3720	-82	243	2510	-589	39	3920 M6, N2
020812776	Benzo(e)pyrene	232	43100	3050	232	43200	3130	0.4	36000 M6, N2
	Perylene	232	11700	746	232	10100	89	14	9940 M6, N2
021012887	Benzo(e)pyrene	278	2610	165	278	2950	287	12	2150 M1, N2
	Perylene	278	765	87	278	871	125	13	522 JN2
021012903	Benzo(e)pyrene	296	2760	161	296	3660	471	28	2290 M1, N2
	Perylene	296	867	80	296	1070	150	21	631 M1, N2

Table 3-20. Alkylated PAH by SIM Field Duplicate Analytical Results Summary

Analyte	Sample ID: 012412017		Sample ID: 012412018		RPD	Sample ID: 012712225		Sample ID: 012712239		RPD	Sample ID: 013012302		Sample ID: 013012303		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
Benzo(e)pyrene	4110	N2	2860	N2	36	17600	N2	68800	N2	119	666	N2	1060	N2	46
C1-Chrysenes	3460	N2	2740	N2	23	28900	N2	62500	N2	74	595	N2	1000	N2	51
C1-Fluoranthenes/Pyrenes	4390	N2	3470	N2	23	38400	N2	99700	N2	89	777	N2	1320	N2	52
C1-Fluorenes	1590	N2	1120	N2	35	30200	N2	47600	N2	45	539	N2	1020	N2	62
C1-Naphthalenes	320	N2	255	N2	23	22500	N2	25000	N2	11	111	JN2	203	N2	59
C1-Phenanthrenes/Anthracenes	4450	N2	3480	N2	24	103000	N2	117000	N2	13	1390	N2	2630	N2	62
C2-Chrysenes	1820	N2	1420	N2	25	17000	N2	28100	N2	49	388	N2	642	N2	49
C2-Fluorenes	1390	N2	1120	N2	22	18400	N2	16400	JN2	11	891	N2	1570	N2	55
C2-Naphthalenes	1050	N2	763	N2	32	31200	N2	23100	N2	30	444	N2	845	N2	62
C2-Phenanthrenes/Anthracenes	1680	N2	1370	N2	20	23400	N2	18700	N2	22	918	N2	1770	N2	63
C3-Chrysenes	1070	N2	836	N2	25	8360	N2	10900	JN2	26	315	N2	462	N2	38
C3-Fluorenes	1950	N2	1560	N2	22	20300	N2	33600	N2	49	807	N2	1460	N2	58
C3-Naphthalenes	1510	N2	1100	N2	31	28300	N2	19200	N2	38					
C3-Phenanthrenes/Anthracenes	1610	N2	1370	N2	16	13500	N2	10500	JN2	25	774	N2	1490	N2	63
C4-Chrysenes	812	N2	622	N2	26	4600	N2	14600	JN2	104	109	JN2	192	N2	55
C4-Naphthalenes	656	N2	489	N2	29	7100	N2	5700	N2	22	489	N2	972	N2	66
C4-Phenanthrenes/Anthracenes	1500	N2	1270	N2	17	13000	N2	41000	N2	104	282	N2	417	N2	39
Perylene	973	N2	703	N2	32	5430	N2	26100	N2	131	158	N2	254	N2	47

Table 3-20. Alkylated PAH by SIM Field Duplicate Analytical Results Summary Continued 1

Analyte	Sample ID: 020212541		Sample ID: 020212558		RPD	Sample ID: 020312569		Sample ID: 020312576		RPD	Sample ID: 021012898		Sample ID: 021012901		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
Benzo(e)pyrene	12100	N2	11100	N2	9	5780	N2	7020	N2	19	2510	N2	782	N2	105
C1-Chrysenes	23900	N2	22200	N2	7	12200	N2	15500	N2	24	5980	N2	1620	N2	115
C1-Fluoranthenes/Pyrenes	43400	N2	40900	N2	6	17000	N2	20300	N2	18	8470	N2	2670	N2	104
C1-Fluorenes	26800	N2	27000	N2	1	6470	N2	7910	N2	20	4160	N2	860	N2	131
C1-Naphthalenes	74800	N2	67000	N2	11	6880	N2	8610	N2	22	4110	N2	1200	N2	110
C1-Phenanthrenes/Anthracenes	95000	N2	76500	N2	22	32100	N2	37500	N2	16	16000	N2	4940	N2	106
C2-Chrysenes	10400	N2	8060	N2	25	9050	N2	11100	N2	20	4300	N2	1120	N2	117
C2-Fluorenes	20600	N2	17600	N2	16	12500	N2	13600	N2	8	5990	N2	1270	N2	130
C2-Naphthalenes	46500	N2	41200	N2	12	11000	N2	13100	N2	17	6170	N2	2030	N2	101
C2-Phenanthrenes/Anthracenes	30000	N2	27200	N2	10	13700	N2	17800	N2	26	6790	N2	2060	N2	107
C3-Chrysenes	5230	N2	3980	N2	27	4910	N2	5810	N2	17	2080	N2	575	N2	113
C3-Fluorenes	15000	N2	12500	N2	18	11100	N2	13700	N2	21	4310	N2	942	N2	128
C3-Naphthalenes	37500	N2	32500	N2	14	12200	N2	13400	N2	9	5910	N2	1980	N2	100
C3-Phenanthrenes/Anthracenes	14400	N2	12200	N2	17	11500	N2	15000	N2	26	4690	N2	1360	N2	110
C4-Chrysenes	2530	N2	1980	N2	24	2270	UN2	2410	UN2	0	841	UN2	229	JN2	NC
C4-Naphthalenes	6430	N2	4730	N2	30	3560	JN2	3870	JN2	8	1540	JN2	443	N2	111
C4-Phenanthrenes/Anthracenes	6690	N2	5410	N2	21	5760	N2	6880	N2	18	2330	N2	735	N2	104
Perylene	2340	N2	1970	N2	17	2270	UN2	2410	UN2	0	841	UN2	202	JN2	NC

Table 3-21. Surrogate Compound Recovery Data for Alkylated PAH by SIM

Lab Sample Number	Field ID	2-Fluorobiphenyl	Nitrobenzene- <i>d</i> ₅	Terphenyl- <i>d</i> ₁₄
4056201001	012312001	78	53	97
4056201005	012312010	86	65	114
4056282001	012412017	81	56	102
4056282002	012412018	79	56	99
4056282009	012412031	70	79	79
4056282012	012412049	84	59	101
4056282015	012412066	85	63	102
4056282020	012412079	84	72	91
4056282022	012512085	80	55	97
4056282026	012512103	81	61	100
4056282028	012512105	83	60	97
4056282029	012512120	83	62	104
4056282032	012512124	84	66	101
4056308001	012512137	80	60	102
4056308006	012612151	78	58	103
4056308009	012612160	77	58	98
4056309003	012612163	85	62	118
4056309006	012612176	76	55	94
4056309011	012612189	78	61	104
4056309014	012712204	82	62	108
4056364001	013012280	75	89	89
4056364004	013012302	75	78	80
4056364005	013012303	77	92	86
4056364008	013012318	77	92	86
4056364011	013012330	88	90	89
4056369001	012712217	93	78	89
4056369004	012712225	82	83	93

Lab Sample Number	Field ID	2-Fluorobiphenyl	Nitrobenzene- <i>d</i> ₅	Terphenyl- <i>d</i> ₁₄
4056369005	012712239	86	95	138 S2
4056369007	012712228	80	63	87
4056369012	012712240	85	76	87
4056369016	012712252	96	124 S2	123 S2
4056369017	012712253	83	83	93
4056370001	013012256	82	80	87
4056370005	013012287	80	76	83
4056370011	013012272	91	73	95
4056465001	020112450	76	87	89
4056465004	020112465	74	91	84
4056465006	020112467	79	92	92
4056466001	013112397	91	122 S2	100
4056466004	013112412	76	72	79
4056466006	020112414	86	64	90
4056466010	020112418	82	91	106
4056466012	020112420	75	95	102
4056467001	013112335	95	73	93
4056467004	013112350	93	67	88
4056467009	013112365	97	88	91
4056467012	013112382	83	81	87
4056468001	020112433	81	84	92
4056468006	020112438	77	81	81
4056468009	020112473	90	87	93
4056552001	020212474	74	85	89
4056552006	020212492	83	79	89
4056552009	020212509	82	74	86
4056552012	020212526	80	96	125 S2
4056553003	020212541	87	139 S2	94

Lab Sample Number	Field ID	2-Fluorobiphenyl	Nitrobenzene- <i>d</i> ₅	Terphenyl- <i>d</i> ₁₄
4056553004	020212558	86	115	90
4056553006	020212543	76	84	103
4056631001	020312559	82	65	84
4056631005	020312569	83	47	86
4056631006	020312576	87	58	91
4056631008	020312577	85	68	92
4056631012	020312591	97	97	101
4056631014	020312594	90	56	96
4056631017	020312608	82	66	90
4056631019	020312612	88	67	91
4056631022	020312627	107	200 S2	152 S2
4056631024	020612629	75	66	77
4056631026	020612631	85	145 S2	108
4056631030	020612643	75	66	78
4056631035	020612659	83	65	86
4056631040	020612675	89	106	98
4056631041	020612676	78	73	87
4056631044	020612683	97	79	103
4056693001	020712693	82	60	87
4056693004	020712703	164 S2	102	152 S2
4056693007	020712707	99	57	107
4056693009	020712709	104	66	109
4056730001	020712725	100	76	104
4056730004	020712739	99	101	113
4056730006	020712741	103	63	107
4056730010	020712755	96	81	103
4056730011	020812759	93	67	104
4056730017	020812769	92	69	96

Lab Sample Number	Field ID	2-Fluorobiphenyl	Nitrobenzene- <i>d</i> ₅	Terphenyl- <i>d</i> ₁₄
4056730018	020812772	89	61	94
4056730020	020812776	102	61	106
4056730022	020812779	88	68	94
4056730025	020812790	108	110	151 S2
4056730027	020812794	98	82	105
4056730030	020812808	113	98	120
4056766001	020912812	91	77	103
4056766003	020912814	86	60	96
4056766007	020912825	96	64	101
4056766010	020912835	86	132 S2	117
4056766012	020912842	105	70	88
4056766017	020912858	109	65	104
4056898001	021012870	88	70	112
4056898002	021012871	86	74	92
4056898006	021012884	97	50	73
4056898009	021012887	88	94	91
4056898010	021012888	97	60	91
4056898013	021012898	89	87	93
4056898014	021012901	90	101	94
4056898016	021012902	109	128 S2	99
4056898017	021012903	82	81	84
4056898020	021012918	85	61	88
4056898021	021012919	79	61	95
4056898024	021312920	84	65	92
4056898027	021312929	90	107	94
4056898030	021312935	100	71	96
4056898033	021312945	88	72	99
4056898035	021312948	86	66	99

Lab Sample Number	Field ID	2-Fluorobiphenyl	Nitrobenzene- <i>d</i> ₅	Terphenyl- <i>d</i> ₁₄
4056898040	021312960	100	94	106
4056898042	021312964	105	79	114
4056898046	021312972	83	67	96
4056898048	021312975	69	82	97
4056898052	021312985	95	81	94

Table 3-22. EPA 8082 Method Blank Analytical Results Summary Water Samples (µg/L)

Analyte	QC Batch: 91597	QC Batch: 91939	QC Batch: 92143
PCB-1016 (Aroclor 1016)	1.0 U	1.0 U	1.0 U
PCB-1221 (Aroclor 1221)	1.0 U	1.0 U	1.0 U
PCB-1232 (Aroclor 1232)	1.0 U	1.0 U	1.0 U
PCB-1242 (Aroclor 1242)	1.0 U	1.0 U	1.0 U
PCB-1248 (Aroclor 1248)	1.0 U	1.0 U	1.0 U
PCB-1254 (Aroclor 1254)	1.0 U	1.0 U	1.0 U
PCB-1260 (Aroclor 1260)	1.0 U	1.0 U	1.0 U

Table 3-22. EPA 8082 Method Blank Analytical Results Summary Soil Samples (µg/Kg)

Analyte	QC Batch: 91544	QC Batch: 91735	QC Batch: 91778	QC Batch: 92058	QC Batch: 92067	QC Batch: 92091	QC Batch: 92161	QC Batch: 92189	QC Batch: 92343	QC Batch: 92447
PCB-1016 (Aroclor 1016)	100 U									
PCB-1221 (Aroclor 1221)	100 U									
PCB-1232 (Aroclor 1232)	100 U									
PCB-1242 (Aroclor 1242)	100 U									
PCB-1248 (Aroclor 1248)	100 U									
PCB-1254 (Aroclor 1254)	100 U									
PCB-1260 (Aroclor 1260)	100 U									

Table 3-23. EPA 8082 Laboratory Control Sample Analytical Results Summary

QC Batch for PCB-1260	Units	Recovery Limits (%)		Spike	Result	Recovery
		Lower	Upper			
91544	µg/Kg	57	130	500	447	89
91735	µg/Kg	57	130	500	463	93
91778	µg/Kg	57	130	500	443	89
92058	µg/Kg	57	130	500	487	97
92067	µg/Kg	57	130	500	489	98
92091	µg/Kg	57	130	500	501	100
92161	µg/Kg	57	130	500	458	92
92189	µg/Kg	57	130	500	438	88
92343	µg/Kg	57	130	500	489	98
92447	µg/Kg	57	130	500	438	88
91597*	µg/L	51	142	5	4.7	93
91939	µg/L	51	142	5	4.7	93
92143	µg/L	51	142	5	5.0	100

* QC Batch 91597 spiked with PCB-1254 instead of PCB-1260

Table 3-24. EPA 8082 MS/MSD Analytical Results Summary

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)
20712722	PCB-1260 (Aroclor 1260)	869	617	65	869	607	63	2	55.7 J
20812776	PCB-1260 (Aroclor 1260)	927	555	60	927	514	55	8	185 U
21012887	PCB-1260 (Aroclor 1260)	1110	3340 J	84	1110	3140	65		2410 J
21312921	PCB-1260 (Aroclor 1260)	1210	1580	88	1210	1340	68	16	515
20312591	PCB-1260 (Aroclor 1260)	973	1010	91	973	1000	90	1	129 J
20612657	PCB-1260 (Aroclor 1260)	919	881	78	919	975	88	10	165 J
21012915	PCB-1260 (Aroclor 1260)	985	1130	108	985	990	94	13	67.9 J

Table 3-25. EPA 8082 Field Duplicate Analytical Results Summary

Analyte	Sample ID: 020312569		Sample ID: 020312576		RPD	Sample ID: 021012898		Sample ID: 021012901		RPD
	Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag		Result (µg/Kg)	Lab Flag	Result (µg/Kg)	Lab Flag	
PCB, Total	500		359		33	3210		2920		9
PCB-1016 (Aroclor 1016)	43.7	U	45.6	U	0	121	U	94.4	U	0
PCB-1221 (Aroclor 1221)	43.7	U	45.6	U	0	121	U	94.4	U	0
PCB-1232 (Aroclor 1232)	43.7	U	45.6	U	0	121	U	94.4	U	0
PCB-1242 (Aroclor 1242)	240		182	J	27	1620		1480		9
PCB-1248 (Aroclor 1248)	43.7	U	45.6	U	0	121	U	94.4	U	0
PCB-1254 (Aroclor 1254)	164	J	105	J	44	1240		1150		8
PCB-1260 (Aroclor 1260)	95.6	J	71.4	J	29	341	J	296	J	14

Table 3-26. Surrogate Compound Recovery Data for Method EPA 8082

Lab Sample Number	Field ID	Decachlorobiphenyl	Tetrachloro- <i>m</i> -xylene
4056631001	020312559	83	85
4056631002	020312560	83	84
4056631003	020312561	79	77
4056631004	020312568	105	78
4056631005	020312569	83	79
4056631006	020312576	85	81
4056631007	020312575	78	79
4056631008	020312577	78	74
4056631009	020312578	0 S4	0 S4
4056631010	020312579	0 S4	0 S4
4056631011	020312587	0 S4	0 S4
4056631012	020312591	109	81
4056631013	020312592	80	81
4056631014	020312594	80	80
4056631015	020312595	82	77
4056631016	020312596	0 S4	0 S4
4056631017	020312608	0 S4	0 S4
4056631018	020312609	0 S4	0 S4
4056631019	020312612	84	80
4056631020	020312613	0 S4	0 S4
4056631021	020312614	0 S4	0 S4
4056631022	020312627	87	90
4056631023	020312628	85	88
4056631024	020612629	72	71
4056631025	020612630	87	82
4056631026	020612631	0 S4	0 S4
4056631027	020612639	74	68

Lab Sample Number	Field ID	Decachlorobiphenyl	Tetrachloro- <i>m</i> -xylene
4056631028	020612641	70	68
4056631029	020612640	76	77
4056631030	020612643	69	72
4056631031	020612644	69	68
4056631032	020612645	76	75
4056631033	020612657	93	81
4056631034	020612658	77	80
4056631035	020612659	72	73
4056631036	020612660	73	75
4056631037	020612661	76	71
4056631038	020612662	0 S4	0 S4
4056631039	020612674	78	80
4056631040	020612675	75	77
4056631041	020612676	63	73
4056631042	020612677	60	70
4056631043	020612678	66	74
4056631044	020612683	63	68
4056631045	020612691	55	66
4056639001	020612611	71	75
4056639002	020712642	51	66
4056693001	020712693	58	69
4056693002	020712694	72	75
4056693003	020712706	69	71
4056693004	020712703	56	66
4056693005	020712704	58	67
4056693006	020712705	70	72
4056693007	020712707	70	75
4056693008	020712708	0 S4	0 S4

Lab Sample Number	Field ID	Decachlorobiphenyl	Tetrachloro- <i>m</i> -xylene
4056693009	020712709	74	75
4056693010	020712722	55	62
4056693011	020712723	56	64
4056725002	020912771	85	79
4056725004	021012811	79	72
4056730001	020712725	61	72
4056730002	020712726	56	64
4056730003	020712727	57	66
4056730004	020712739	59	68
4056730005	020712740	57	67
4056730006	020712741	53	66
4056730007	020712742	55	62
4056730008	020712743	57	65
4056730009	020712751	56	65
4056730010	020712755	54	64
4056730011	020812759	57	64
4056730012	020812760	60	66
4056730013	020812761	59	65
4056730014	020812764	58	65
4056730015	020812770	59	67
4056730016	020812765	50	59
4056730017	020812769	60	64
4056730018	020812772	61	68
4056730019	020812773	49	59
4056730020	020812776	49	59
4056730021	020812777	84	85
4056730022	020812779	75	73
4056730023	020812780	55	63

Lab Sample Number	Field ID	Decachlorobiphenyl	Tetrachloro- <i>m</i> -xylene
4056730024	020812781	48	54
4056730025	020812790	53	61
4056730026	020812791	54	59
4056730027	020812794	54	65
4056730028	020812795	58	66
4056730029	020812796	69	72
4056730030	020812808	54	62
4056730031	020812809	63	65
4056766001	020912812	71	72
4056766002	020912813	69	73
4056766003	020912814	74	78
4056766004	020912822	60	67
4056766005	020912823	59	65
4056766006	020912824	61	67
4056766007	020912825	62	70
4056766008	020912826	60	65
4056766009	020912827	0 S4	0 S4
4056766010	020912835	0 S4	0 S4
4056766011	020912841	70	64
4056766012	020912842	61	68
4056766013	020912843	73	74
4056766014	020912844	63	59
4056766015	020912854	58	66
4056766016	020912855	53	57
4056766017	020912858	57	64
4056766018	020912861	85	61
4056766019	020912868	70	74
4056894001	021312869	73	72

Lab Sample Number	Field ID	Decachlorobiphenyl	Tetrachloro- <i>m</i> -xylene
4056898001	021012870	77	74
4056898002	021012871	80	70
4056898003	021012873	101	71
4056898004	021012882	80	81
4056898005	021012883	82	83
4056898006	021012884	79	78
4056898007	021012885	0 S4	0 S4
4056898008	021012886	0 S4	0 S4
4056898009	021012887	0 S4	0 S4
4056898010	021012888	77	77
4056898011	021012889	77	77
4056898012	021012890	74	70
4056898013	021012898	104	70
4056898014	021012901	94	72
4056898015	021012899	79	81
4056898016	021012902	0 S4	0 S4
4056898017	021012903	0 S4	0 S4
4056898018	021012904	0 S4	0 S4
4056898019	021012905	0 S4	0 S4
4056898020	021012918	74	76
4056898021	021012919	72	74
4056898022	021012915	85	86
4056898023	021012916	74	78
4056898024	021312920	79	78
4056898025	021312921	65	64
4056898026	021312922	68	68
4056898027	021312929	61	54
4056898028	021312933	69	69

Lab Sample Number	Field ID	Decachlorobiphenyl	Tetrachloro- <i>m</i> -xylene
4056898029	021312934	63	63

Data Validation Report

Project #2069

North Branch/Division Street

**Sediment and Aqueous Sample Analyses
Performed by**

**Pace Analytical; Green Bay and Minneapolis
and
TestAmerica, Burlington**

Prepared for



Prepared by

SHEPHERD TECHNICAL SERVICES

March 7, 2014

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1.0 INTRODUCTION

All data validation was performed by Shepherd Technical Services following US EPA National Functional Guidelines (NFG), where applicable, using electronic deliverables. Guidance and requirements appearing in the NRT Multi-Site Quality Assurance Project Plan, Rev. 2, 2007 ("Multi-Site QAPP") were also used in the validation process.

Pace Analytical Services, Inc., Green Bay, WI performed the sample analyses on the sediment samples. The Pace Green Bay laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200050). The Pace laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Florida Department of Health Environmental Laboratory Certification Program (ID #E87948).

Pace Analytical Services, Inc., Minneapolis, MN also performed the sample analyses on the sediment samples. The Pace Minneapolis laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200011). The Pace Minneapolis laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Minnesota Department of Health, Environmental Laboratory Accreditation Program (ID # 027-053-137).

TestAmerica Burlington performed analyses for total organic carbon (TOC) and black carbon. The Burlington facility also performed additional analyses for the equipment blanks. The TestAmerica Burlington laboratory holds primary accreditation under the National Environmental Laboratory Accreditation Program (NELAP) by the New Jersey Department of Environmental Protection (ID # VT972).

The laboratories provided all analytical data, including all internal laboratory QC results in an electronic deliverable format.

A total of 296 total sediment samples and 40 aqueous samples (trip blanks, field blanks, equipment blanks, etc.) were collected October 28, 2013 to December 12, 2013 at the North Branch Division Street sites. Upon collection, all samples were held securely prior to shipping to the laboratory. Samples were organized into 37 sample delivery groups (SDGs, or laboratory lot numbers). Samples were analyzed for the indicated parameters using the methods listed in Table 1-1.

The following discrepancies were noted by PACE at sample login;

- Sample 111113041: the container lid was labeled as 111113038; sample was matched by the collection date and time and logged in as 111113041.

The following discrepancies were noted by TestAmerica at sample login;

- COC form for sample 111513208 listed the field ID as 111513208 while the container label showed 111513202. The sample was logged in as per the COC.
- Two sample volumes were received both labeled as 111913276 with different colors and consistencies. The client stated the lighter color sample is 111913274 and the darker color is 111913276.

Table 1-1. PACE Sample/SDG Cross Reference

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
102813264	4087646001	X	X	X	X	X	X	X		X
102813265	4087646002		X	X	X	X	X	X	X	X
102813266	4087646003		X	X	X	X	X	X	X	X
102813273	4087646004		X	X	X	X	X	X	X	X
102813277	4087646005		X	X	X	X	X	X	X	X
102813281	4087646006		X	X	X	X	X	X	X	X
102813282	4087646007	X	X	X	X	X	X	X		X
102813283	4087646008		X	X	X	X	X	X	X	X
102813284	4087646009		X	X	X	X	X	X	X	X
102813287	4087646010		X	X	X	X	X	X	X	X
102813288	4087646011		X	X	X	X	X	X	X	X
102913291	4087646012	X	X	X	X	X	X	X		X
102913292	4087646013		X	X	X	X	X	X	X	X
102913293	4087646014		X	X	X	X	X	X	X	X
102913299	4087646015		X	X	X	X	X	X	X	X
102913300	4087646016	X	X	X	X	X	X	X		X
102913301	4087646017		X	X	X	X	X	X	X	X
102913306	4087646018		X	X	X	X	X	X	X	X
102913308	4087646019	X	X	X	X	X	X	X		X
102913309	4087646020		X	X	X	X	X	X	X	X
102913310	4087646021		X	X	X	X	X	X	X	X
102913313	4087646022		X	X	X	X	X	X	X	X
102913317	4087646023	X	X	X	X	X	X	X		X
102913325	4087646024		X	X	X	X	X	X	X	X
102913327	4087646025	X	X	X	X	X	X	X		X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
102913328	4087646026		X	X	X	X	X	X	X	X
102913329	4087646027		X	X	X	X	X	X	X	X
102913338	4087646028		X	X	X	X	X	X	X	X
102913343	4087646029		X	X	X	X	X	X	X	X
102913348	4087646030		X	X	X	X	X	X	X	X
102913349	4087646031	X	X	X	X	X	X	X		X
102913350	4087646032		X	X	X	X	X	X	X	X
102913351	4087646033		X	X	X	X	X	X	X	X
102913355	4087646034		X	X	X	X	X	X	X	X
102913361	4087646035		X	X	X	X	X	X	X	X
110113375	4088053001	X	X	X	X	X	X	X		X
110113376	4088053002		X	X	X	X	X	X	X	X
110113377	4088053003		X	X	X	X	X	X	X	X
110113380	4088053004		X	X	X	X	X	X	X	X
110113386	4088053005	X	X	X	X	X	X	X		X
110113389	4088053006		X	X	X	X	X	X	X	X
110113390	4088053007		X	X	X	X	X	X	X	X
110113392	4088053008		X	X	X	X	X	X	X	X
110113393	4088053009	X	X	X	X	X	X	X		X
110113394	4088053010		X	X	X	X	X	X	X	X
110113395	4088053011		X	X	X	X	X	X	X	X
110113399	4088053012		X	X	X	X	X	X	X	X
110113406	4088053013		X	X	X	X	X	X	X	X
110113408	4088053014		X	X	X	X	X	X	X	X
110113410	4088053015	X	X	X	X	X	X	X		X
110113411	4088053016		X	X	X	X	X	X	X	X
110113412	4088053017		X	X	X	X	X	X	X	X
110113424	4088053018		X	X	X	X	X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
110113429	4088053019		X	X	X	X	X	X	X	X
110413432	4088053020	X	X	X	X	X	X	X		X
110413433	4088053021		X	X	X	X	X	X	X	X
110413434	4088053022		X	X	X	X	X	X	X	X
110413441	4088053023		X	X	X	X	X	X	X	X
110413443	4088053024		X	X	X	X	X	X	X	X
110413448	4088053025	X	X	X	X	X	X	X		X
110413449	4088053026		X	X	X	X	X	X	X	X
110413450	4088053027		X	X	X	X	X	X	X	X
110413457	4088053028		X	X	X	X	X	X	X	X
110413458	4088053029		X	X	X	X	X	X	X	X
110413460	4088053030		X	X	X	X	X	X	X	X
110413461	4088053031	X	X	X	X	X	X	X		X
110413462	4088053032		X	X	X	X	X	X	X	X
110413463	4088053033		X	X	X	X	X	X	X	X
110413466	4088053034		X	X	X	X	X	X	X	X
110413470	4088053035	X	X	X	X	X	X	X		X
110413471	4088053036		X	X	X	X	X	X	X	X
110813001	4088482001	X	X	X	X		X	X		X
110813002	4088482002		X	X	X		X	X	X	X
110813003	4088482003		X	X	X		X	X	X	X
110813017	4088482004		X	X	X		X	X	X	X
110813019	4088482005	X	X	X	X		X	X		X
110813020	4088482006		X	X	X		X	X	X	X
110813022	4088482007		X						X	
110813504	4088486001	X	X	X	X	X	X	X		X
110813505	4088486002		X	X	X	X	X	X	X	X
110813506	4088486003		X	X	X	X	X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
110813510	4088486004		X	X	X	X	X	X	X	X
110813515	4088486005	X	X	X	X	X	X	X		X
110813517	4088486006		X	X	X	X	X	X	X	X
110813518	4088486007		X	X	X	X	X	X	X	X
111113024	4088482008	X	X	X	X		X	X		X
111113025	4088482009		X	X	X		X	X	X	X
111113026	4088482010		X	X	X		X	X	X	X
111113030	4088482011		X	X	X		X	X	X	X
111113034	4088482012		X	X	X		X	X	X	X
111113038	4088482013		X	X	X		X	X	X	X
111113041	4088482014		X	X	X		X	X	X	X
111213043	4088482015	X	X	X	X		X	X		X
111213044	4088482016		X	X	X		X	X	X	X
111213045	4088482017		X	X	X		X	X	X	X
111213062	4088482018		X	X	X		X	X	X	X
111213063	4088482019		X	X	X		X	X	X	X
111213064	4088482020		X	X	X		X	X	X	X
111313070	4088622001	X	X	X	X		X	X		X
111313071	4088622002		X	X	X		X	X	X	X
111313072	4088622003		X	X	X		X	X	X	X
111313084	4088622004		X	X	X		X	X	X	X
111313085	4088622005	X	X	X	X		X	X		X
111313087	4088622006		X	X	X		X	X	X	X
111313092	4088622007		X	X	X		X	X	X	X
111313095	4088622008		X	X	X		X	X	X	X
111313096	4088622009	X	X	X	X		X	X		X
111313097	4088622010		X	X	X		X	X	X	X
111313098	4088622011		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
111313110	4088622012		X	X	X		X	X	X	X
111313114	4088622013		X	X	X		X	X	X	X
111413118	4088622014	X	X	X	X		X	X		X
111413119	4088622015		X	X	X		X	X	X	X
111413120	4088622016		X	X	X		X	X	X	X
111413134	4088622017		X	X	X		X	X	X	X
111413137	4088622018		X	X	X		X	X	X	X
111413139	4088622019	X	X	X	X		X	X		X
111413140	4088622020		X	X	X		X	X	X	X
111413141	4088622021		X	X	X		X	X	X	X
111413153	4088622022		X	X	X		X	X	X	X
111413154	4088622023	X	X	X	X		X	X		X
111413155	4088622024		X	X	X		X	X	X	X
111513159	4088879001	X	X	X	X		X	X		X
111513160	4088879002		X	X	X		X	X	X	X
111513161	4088879003		X	X	X		X	X	X	X
111513178	4088879004		X	X	X		X	X	X	X
111513179	4088879005		X	X	X		X	X	X	X
111513182	4088879006	X	X	X	X		X	X		X
111513183	4088879007		X	X	X		X	X	X	X
111513184	4088879008		X	X	X		X	X	X	X
111513187	4088879009	X	X	X	X		X	X		X
111513192	4088879010		X	X	X		X	X	X	X
111513193	4088879011		X	X	X		X	X	X	X
111513194	4088879012		X	X	X		X	X	X	X
111513199	4088879013	X	X	X	X		X	X		X
111513200	4088879014		X	X	X		X	X		X
111513201	4088879015		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
111513208	4088879048		X	X	X		X	X	X	X
111813210	4088879016	X	X	X	X		X	X		X
111813211	4088879017		X	X	X		X	X	X	X
111813212	4088879018		X	X	X		X	X	X	X
111813220	4088879019		X	X	X		X	X	X	X
111813221	4088879020		X	X	X		X	X	X	X
111813223	4088879021	X	X	X	X		X	X		X
111813224	4088879022		X	X	X		X	X	X	X
111813225	4088879023		X	X	X		X	X	X	X
111813235	4088879024	X	X	X	X		X	X		X
111813236	4088879025		X	X	X		X	X	X	X
111813237	4088879026		X	X	X		X	X	X	X
111813239	4088879027	X	X	X	X		X	X		X
111813240	4088879028		X	X	X		X	X	X	X
111813241	4088879029		X	X	X		X	X	X	X
111813251	4088879030		X	X	X		X	X	X	X
111813252	4088879031		X	X	X		X	X	X	X
111813258	4088879032		X	X	X		X	X	X	X
111913260	4088879033	X	X	X	X		X	X		X
111913261	4088879034		X	X	X		X	X	X	X
111913262	4088879035		X	X	X		X	X	X	X
111913274	4088879036		X	X	X		X	X	X	X
111913276	4088879037		X	X	X		X	X	X	X
111913279	4088879038	X	X	X	X		X	X		X
111913280	4088879039		X	X	X		X	X	X	X
111913281	4088879040		X	X	X		X	X	X	X
111913292	4088879041		X	X	X		X	X	X	X
111913293	4088879042		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
111913298	4088879043	X	X	X	X		X	X		X
111913299	4088879044		X	X	X		X	X	X	X
111913300	4088879045		X	X	X		X	X	X	X
111913305	4088879046		X	X	X		X	X	X	X
111913307	4088879047		X	X	X		X	X	X	X
112013310	4089023001	X	X	X	X		X	X		X
112013311	4089023002		X	X	X		X	X	X	X
112013312	4089023003		X	X	X		X	X	X	X
112013318	4089023004		X	X	X		X	X	X	X
112013327	4089023005	X	X	X	X		X	X		X
112013328	4089023006		X	X	X		X	X	X	X
112013331	4089023007	X	X	X	X		X	X		X
112013332	4089023008		X	X	X		X	X	X	X
112013333	4089023009		X	X	X		X	X	X	X
112013340	4089023010		X	X	X		X	X	X	X
112013343	4089023011		X	X	X		X	X	X	X
112013344	4089023012		X	X	X		X	X	X	X
112013346	4089023013	X	X	X	X		X	X		X
112013347	4089023014		X	X	X		X	X	X	X
112013348	4089023015		X	X	X		X	X	X	X
112013358	4089023016		X	X	X		X	X	X	X
112013364	4089023017		X	X	X		X	X	X	X
112113366	4089023018	X	X	X	X		X	X		X
112113367	4089023019		X	X	X		X	X	X	X
112113368	4089023020		X	X	X		X	X	X	X
112113371	4089023021		X	X	X		X	X	X	X
112113382	4089023022		X	X	X		X	X	X	X
112113383	4089023023		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
112113385	4089023024	X	X	X	X		X	X		X
112113386	4089023025		X	X	X		X	X	X	X
112113387	4089023026		X	X	X		X	X	X	X
112113389	4089023027		X	X	X		X	X	X	X
112113399	4089023028		X	X	X		X	X	X	X
112113400	4089023029		X	X	X		X	X	X	X
112213406	4089202001	X	X	X	X		X	X		X
112213407	4089202002		X	X	X		X	X	X	X
112213408	4089202003		X	X	X		X	X	X	X
112213422	4089202004		X	X	X		X	X	X	X
112213423	4089202005		X	X	X		X	X	X	X
112213424	4089202006		X	X	X		X	X	X	X
112213425	4089202007	X	X	X	X		X	X		X
112213426	4089202008		X	X	X		X	X	X	X
112213427	4089202009		X	X	X		X	X	X	X
112213443	4089202010		X	X	X		X	X	X	X
112213444	4089202011		X	X	X		X	X	X	X
112213446	4089202012		X	X	X		X	X	X	X
112213447	4089202013	X	X	X	X		X	X		X
112213448	4089202014		X	X	X		X	X	X	X
112213449	4089202015		X	X	X		X	X	X	X
112213450	4089202016		X	X	X		X	X	X	X
112513452	4089202017	X	X	X	X		X	X		X
112513453	4089202018		X	X	X		X	X	X	X
112513454	4089202019		X	X	X		X	X	X	X
112513466	4089202020	X	X	X	X		X	X		X
112513467	4089202021		X	X	X		X	X	X	X
112513468	4089202022		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
112513469	4089202023		X	X	X		X	X	X	X
112513473	4089202024	X	X	X	X		X	X		X
112513474	4089202025		X	X	X		X	X	X	X
112513475	4089202026		X	X	X		X	X	X	X
112513485	4089202027		X	X	X		X	X	X	X
112513486	4089202028		X	X	X		X	X	X	X
112513486	4089362001	X	X	X	X		X	X		X
112613491	4089362002		X	X	X		X	X	X	X
112613492	4089362003		X	X	X		X	X	X	X
112613503	4089362004	X	X	X	X		X	X		X
112613504	4089362005		X	X	X		X	X	X	X
112613505	4089362006		X	X	X		X	X	X	X
112613506	4089362007		X	X	X		X	X	X	X
112613517	4089362008		X	X	X		X	X	X	X
120213522	4089509001	X	X	X	X		X	X		X
120213523	4089509002		X	X	X		X	X	X	X
120213524	4089509003		X	X	X		X	X	X	X
120213532	4089509004		X	X	X		X	X	X	X
120213535	4089509005		X	X	X		X	X	X	X
120213545	4089509006	X	X	X	X		X	X		X
120213546	4089509007		X	X	X		X	X	X	X
120213547	4089509008		X	X	X		X	X	X	X
120213557	4089509009		X	X	X		X	X	X	X
120213558	4089509010		X	X	X		X	X	X	X
120213559	4089509011	X	X	X	X		X	X		X
120213560	4089509012		X	X	X		X	X	X	X
120213570	4089509013		X	X	X		X	X	X	X
120313572	4089509014	X	X	X	X		X	X		X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
120313573	4089509015		X	X	X		X	X	X	X
120313574	4089509016		X	X	X		X	X	X	X
120313581	4089509017		X	X	X		X	X	X	X
120313582	4089509018		X	X	X		X	X	X	X
120313588	4089509019	X	X	X	X		X	X		X
120313589	4089509020		X	X	X		X	X	X	X
120313590	4089509021		X	X	X		X	X	X	X
120313602	4089509022		X	X	X		X	X	X	X
120313603	4089509023	X	X	X	X		X	X		X
120313604	4089509024		X	X	X		X	X	X	X
120413617	4089665001	X	X	X	X		X	X		X
120413618	4089665002		X	X	X		X	X	X	X
120413619	4089665003		X	X	X		X	X	X	X
120413629	4089665004		X	X	X		X	X	X	X
120413630	4089665005		X	X	X		X	X	X	X
120413632	4089665006		X	X	X		X	X	X	X
120413633	4089665007	X	X	X	X		X	X		X
120413634	4089665008		X	X	X		X	X	X	X
120413635	4089665009		X	X	X		X	X	X	X
120413641	4089665010		X	X	X		X	X	X	X
120413642	4089665011		X	X	X		X	X	X	X
120413645	4089665012	X	X	X	X		X	X		X
120413646	4089665013		X	X	X		X	X	X	X
120413653	4089665014		X	X	X		X	X	X	X
120413654	4089665015		X	X	X		X	X	X	X
120613845	4089818001	X	X	X	X		X	X		X
120613846	4089818002		X	X	X		X	X	X	X
120613847	4089818003		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
120613851	4089818004		X	X	X		X	X	X	X
120613859	4089818005		X	X	X		X	X	X	X
120613860	4089818006		X	X	X		X	X	X	X

Table 1-2. TestAmerica Sample/SDG Cross Reference

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
102813262	200-19227-36	X	X	X	X	X	X	X			
102813263	200-19227-37				X						
102813264	200-19227-1								X	X	X
102813265	200-19227-2									X	X
102813266	200-19227-3									X	X
102813273	200-19227-4									X	X
102813277	200-19227-5									X	X
102813281	200-19227-6									X	X
102813282	200-19227-7								X	X	X
102813283	200-19227-8									X	X
102813284	200-19227-9									X	X
102813287	200-19227-10									X	X
102813288	200-19227-11									X	X
102913290	200-19227-38	X	X	X	X	X	X	X			
102913291	200-19227-12								X	X	X
102913292	200-19227-13									X	X
102913293	200-19227-14									X	X
102913299	200-19227-15									X	X
102913300	200-19227-16								X	X	X
102913301	200-19227-17									X	X
102913306	200-19227-18									X	X
102913308	200-19227-19								X	X	X
102913309	200-19227-20									X	X
102913310	200-19227-21									X	X
102913313	200-19227-22									X	X
102913317	200-19227-23								X	X	X
102913325	200-19227-24									X	X
102913327	200-19227-25								X	X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
102913328	200-19227-26									X	X
102913329	200-19227-27									X	X
102913338	200-19227-28									X	X
102913343	200-19227-29									X	X
102913348	200-19227-30									X	X
102913349	200-19227-31								X	X	X
102913350	200-19227-32									X	X
102913351	200-19227-33									X	X
102913355	200-19227-34									X	X
102913361	200-19227-35									X	X
103013363	200-19267-1	X	X	X	X	X	X	X			
103013364	200-19267-2				X						
110113373	200-19364-1	X	X	X	X	X	X	X			
110113374	200-19364-2				X						
110113375	200-19364-5								X	X	X
110113376	200-19364-6									X	X
110113377	200-19364-7									X	X
110113380	200-19364-8									X	X
110113386	200-19364-9								X	X	X
110113389	200-19364-10									X	X
110113390	200-19364-11									X	X
110113392	200-19364-12									X	X
110113393	200-19364-13								X	X	X
110113394	200-19364-14									X	X
110113395	200-19364-15									X	X
110113399	200-19364-16									X	X
110113406	200-19364-17									X	X
110113408	200-19364-18									X	X
110113410	200-19364-19								X	X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
110113411	200-19364-20									X	X
110113412	200-19364-21									X	X
110113424	200-19364-22									X	X
110113429	200-19364-23									X	X
110413431	200-19364-3	X	X	X	X	X	X	X			
110413432	200-19364-24								X	X	X
110413433	200-19364-25									X	X
110413434	200-19364-26									X	X
110413441	200-19364-27									X	X
110413443	200-19364-28									X	X
110413448	200-19364-29								X	X	X
110413449	200-19364-30									X	X
110413450	200-19364-31									X	X
110413457	200-19364-32									X	X
110413458	200-19364-33									X	X
110413460	200-19364-34									X	X
110413461	200-19364-35								X	X	X
110413462	200-19364-36									X	X
110413463	200-19364-37									X	X
110413466	200-19364-38									X	X
110413470	200-19364-39								X	X	X
110413471	200-19364-40									X	X
110513474	200-19364-4	X	X	X	X	X	X	X			
110713490	200-19434-1	X	X	X	X	X	X	X			
110713491	200-19434-2				X						
110813001	200-19557-5								X	X	X
110813002	200-19557-6									X	X
110813003	200-19557-7									X	X
110813017	200-19557-8									X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
110813019	200-19557-9								X	X	X
110813020	200-19557-10									X	X
110813502	200-19557-1	X	X	X	X	X	X	X			
110813503	200-19557-2				X						
110813504	200-19557-24								X	X	X
110813505	200-19557-25									X	X
110813506	200-19557-26									X	X
110813510	200-19557-27									X	X
110813515	200-19557-28								X	X	X
110813517	200-19557-29									X	X
110813518	200-19557-30									X	X
111113023	200-19557-3	X	X		X	X	X	X			
111113024	200-19557-11								X	X	X
111113025	200-19557-12									X	X
111113026	200-19557-13									X	X
111113030	200-19557-14									X	X
111113034	200-19557-15									X	X
111113038	200-19557-16									X	X
111113041	200-19557-17									X	X
111213042	200-19557-4	X	X		X	X	X	X			
111213043	200-19557-18								X	X	X
111213044	200-19557-19									X	X
111213045	200-19557-20									X	X
111213062	200-19557-21									X	X
111213063	200-19557-22									X	X
111213064	200-19557-23									X	X
111313070	200-19575-4								X	X	X
111313071	200-19575-5									X	X
111313072	200-19575-6									X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
111313084	200-19575-7									X	X
111313085	200-19575-8								X	X	X
111313087	200-19575-9									X	X
111313092	200-19575-10									X	X
111313095	200-19575-11									X	X
111313096	200-19575-12								X	X	X
111313097	200-19575-13									X	X
111313098	200-19575-14									X	X
111313110	200-19575-15									X	X
111313114	200-19575-27									X	X
111413118	200-19575-16								X	X	X
111413119	200-19575-17									X	X
111413120	200-19575-18									X	X
111413134	200-19575-19									X	X
111413137	200-19575-20									X	X
111413139	200-19575-21								X	X	X
111413140	200-19575-22									X	X
111413141	200-19575-23									X	X
111413153	200-19575-24									X	X
111413154	200-19575-25								X	X	X
111413155	200-19575-26									X	X
111513157	200-19664-1	X	X		X	X	X	X			
111513158	200-19664-2				X						
111513159	200-19664-5								X	X	X
111513160	200-19664-6									X	X
111513161	200-19664-7									X	X
111513178	200-19664-8									X	X
111513179	200-19664-9									X	X
111513182	200-19664-10								X	X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
111513183	200-19664-11									X	X
111513184	200-19664-12									X	X
111513187	200-19664-13								X	X	X
111513192	200-19664-14									X	X
111513193	200-19664-15									X	X
111513194	200-19664-16									X	X
111513199	200-19664-17								X	X	X
111513200	200-19664-18									X	X
111513201	200-19664-19									X	X
111513208	200-19664-52									X	X
111813209	200-19664-3	X	X		X	X	X	X			
111813210	200-19664-21								X	X	X
111813211	200-19664-22									X	X
111813212	200-19664-23									X	X
111813220	200-19664-24									X	X
111813221	200-19664-25									X	X
111813223	200-19664-26								X	X	X
111813224	200-19664-27									X	X
111813225	200-19664-28									X	X
111813235	200-19664-29								X	X	X
111813236	200-19664-30									X	X
111813237	200-19664-31									X	X
111813239	200-19664-32								X	X	X
111813240	200-19664-33									X	X
111813241	200-19664-34									X	X
111813251	200-19664-35									X	X
111813252	200-19664-36									X	X
111813258	200-19664-37									X	X
111913259	200-19664-4	X	X		X	X	X	X			

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
111913260	200-19664-38								X	X	X
111913261	200-19664-39									X	X
111913262	200-19664-40									X	X
111913274	200-19664-53									X	X
111913276	200-19664-41									X	X
111913279	200-19664-42								X	X	X
111913280	200-19664-43									X	X
111913281	200-19664-44									X	X
111913292	200-19664-45									X	X
111913293	200-19664-46									X	X
111913298	200-19664-47								X	X	X
111913299	200-19664-48									X	X
111913300	200-19664-49									X	X
111913305	200-19664-50									X	X
111913307	200-19664-51									X	X
112013308	200-19709-1	X	X		X	X	X	X			
112013309	200-19709-2				X						
112013310	200-19709-4								X	X	X
112013311	200-19709-5									X	X
112013312	200-19709-6									X	X
112013318	200-19709-7									X	X
112013327	200-19709-8								X	X	X
112013328	200-19709-9									X	X
112013331	200-19709-10								X	X	X
112013332	200-19709-11									X	X
112013333	200-19709-12									X	X
112013340	200-19709-13									X	X
112013343	200-19709-14									X	X
112013344	200-19709-15									X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
112013346	200-19709-16								X	X	X
112013347	200-19709-17									X	X
112013348	200-19709-18									X	X
112013358	200-19709-19									X	X
112013364	200-19709-20									X	X
112113365	200-19709-3	X	X		X	X	X	X			
112113366	200-19709-21								X	X	X
112113367	200-19709-22									X	X
112113368	200-19709-23									X	X
112113371	200-19709-24									X	X
112113382	200-19709-25									X	X
112113383	200-19709-26									X	X
112113385	200-19709-27								X	X	X
112113386	200-19709-28									X	X
112113387	200-19709-29									X	X
112113389	200-19709-30									X	X
112113399	200-19709-31									X	X
112113400	200-19709-32									X	X
112213404	200-19777-1	X	X		X	X	X	X			
112213405	200-19777-2				X						
112213406	200-19777-4								X	X	X
112213407	200-19777-5									X	X
112213408	200-19777-6									X	X
112213422	200-19777-7									X	X
112213423	200-19777-8									X	X
112213424	200-19777-9									X	X
112213425	200-19777-10								X	X	X
112213426	200-19777-11									X	X
112213427	200-19777-12									X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
112213443	200-19777-13									X	X
112213444	200-19777-14									X	X
112213446	200-19777-15									X	X
112213447	200-19777-16								X	X	X
112213448	200-19777-17									X	X
112213449	200-19777-18									X	X
112213450	200-19777-19									X	X
112513451	200-19777-3	X	X		X	X	X	X			
112513452	200-19777-20								X	X	X
112513453	200-19777-21									X	X
112513454	200-19777-22									X	X
112513466	200-19777-23								X	X	X
112513467	200-19777-24									X	X
112513468	200-19777-25									X	X
112513469	200-19777-26									X	X
112513473	200-19777-27								X	X	X
112513474	200-19777-28									X	X
112513475	200-19777-29									X	X
112513485	200-19777-30									X	X
112513486	200-19777-31									X	X
112613490	200-19822-1								X	X	X
112613491	200-19822-2									X	X
112613492	200-19822-3									X	X
112613503	200-19822-4								X	X	X
112613504	200-19822-5									X	X
112613505	200-19822-6									X	X
112613506	200-19822-7									X	X
112613517	200-19822-8									X	X
120213518	200-19822-9	X	X		X	X	X	X			

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
120213519	200-19822-10				X						
120213520	200-19876-1	X	X		X	X	X	X			
120213521	200-19876-2				X						
120213522	200-19876-4								X	X	X
120213523	200-19876-5									X	X
120213524	200-19876-6									X	X
120213532	200-19876-7									X	X
120213535	200-19876-8									X	X
120213545	200-19876-9								X	X	X
120213546	200-19876-10									X	X
120213547	200-19876-11									X	X
120213557	200-19876-12									X	X
120213558	200-19876-13									X	X
120213559	200-19876-14								X	X	X
120213560	200-19876-15									X	X
120213570	200-19876-16									X	X
120313571	200-19876-3	X	X		X	X	X	X			
120313572	200-19876-17								X	X	X
120313573	200-19876-18									X	X
120313574	200-19876-19									X	X
120313581	200-19876-20									X	X
120313582	200-19876-21									X	X
120313588	200-19876-22								X	X	X
120313589	200-19876-23									X	X
120313590	200-19876-24									X	X
120313602	200-19876-25									X	X
120313603	200-19876-26								X	X	X
120313604	200-19876-27									X	X
120413615	200-19939-1	X	X		X	X	X	X			

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
120413616	200-19939-2				X						
120413617	200-19939-4								X	X	X
120413618	200-19939-5									X	X
120413619	200-19939-6									X	X
120413629	200-19939-7									X	X
120413630	200-19939-8									X	X
120413632	200-19939-9									X	X
120413633	200-19939-10								X	X	X
120413634	200-19939-11									X	X
120413635	200-19939-12									X	X
120413641	200-19939-13									X	X
120413642	200-19939-14									X	X
120413645	200-19939-15								X	X	X
120413646	200-19939-16									X	X
120413653	200-19939-17									X	X
120413654	200-19939-18									X	X
120513657	200-19939-3	X	X		X	X	X	X			
120613843	200-20035-1	X	X	X	X	X		X			
120613844	200-20035-2				X						
120613845	200-20035-4								X	X	X
120613846	200-20035-5									X	X
120613847	200-20035-6									X	X
120613851	200-20035-7									X	X
120613859	200-20035-8									X	X
120613860	200-20035-9									X	X
120913863	200-20035-3					X					
121013867	200-20074-1					X					
121113524	200-20074-2					X					

2.0 INORGANIC DATA REVIEW

2.1 Summary

Blank, spiked, and duplicate results were provided. Overall, QC data indicated acceptable precision and accuracy. The results of the QC review are presented below.

2.2 Sample Receipt and Methodology

The sediment samples were analyzed for inorganic parameters following the methods cited in Table 2-1.

Table 2-1. Sediment Inorganic Analytes and Methods Summary

<i>Analytical Method</i>	<i>Analyte</i>
EPA 6020	Metals
EPA 7470/7471	Mercury
EPA 9012	Cyanide
ASTM D2974-87	Percent Moisture
Lloyd Kahn BC	Black Carbon
Lloyd Kahn TOC	Total Organic Carbon

Generally, the samples arrived at the laboratories properly preserved and in good condition. Some of the samples were held in the field for one or two days prior to delivery to the laboratory. Most samples were analyzed within the prescribed holding times, where holding times have been defined. A few of the Total Organic Carbon (TOC) samples were reanalyzed outside of the holding time. Samples 111413154, 111513155, 111513159, 111513194, 111513199, 111513200, and 111513208 fall into this category and all will be qualified as estimated ("J") for TOC.

2.3 Blanks

The initial and continuing calibration blanks (ICBs/CCBs) for ICP/MS metals on many occasions gave values above the limit of detection but below the reporting limit (limit of quantitation) for some of the elements. All of the calibration blank values are well below the reporting limit with the exception of one copper value that is above the reporting limit. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

The initial and continuing calibration blanks (ICBs/CCBs) for mercury on occasion gave values above the limit of detection but below the reporting limit (limit of quantitation). All of the calibration blank values are well below the reporting limit.

The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified

The initial and continuing calibration blanks (ICBs/CCBs) for cyanide on occasion gave values above the limit of detection but below the reporting limit (limit of quantitation). All of the calibration blank values are well below the reporting limit. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified

The initial and continuing calibration blanks (ICBs/CCBs) for Total Organic Carbon and Black Carbon in many cases gave results above the reporting limit. However, in all cases the measured values in the blanks were at least an order of magnitude lower than measured values in the samples. Therefore, no data are qualified as a consequence of the calibration blank data.

Method blanks were prepared for each batch of samples prepared for analysis for each method.

Several batches had some elements detected in the method blanks that were above the limited of detection but below the reporting limit for Method 6020. Those affected batches and elements are detailed in the method blank tables below. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

One method blank for total cyanide gave a positive value between the limit of detection and the reporting limit. The affected batch is detailed in the method blank tables below. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

A few of the method blanks for mercury gave positive values between the limit of detection and the reporting limit. Those affected batches and elements are detailed in the method blank tables below. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

Method blanks for black carbon gave no positive values above the reporting limit. Many of the method blanks for total organic carbon gave a positive value between the limit of detection and the reporting limit. All sample values are considerably more than ten times the detected contamination level reported. No results will be qualified based on the levels detected in the samples.

Twenty-three equipment blanks were submitted for analysis. Overall most equipment blanks showed some level of contamination for metals. Most of the observed values were between the detection limit and the reporting limit. The effected sediment sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

The method blank results are summarized in Tables 2-2 through 2-9.

Table 2-2. Sediment Method 6020 Blank Results Summary (mg/Kg)

Parameter	QC Batch: 146599	QC Batch: 146600	QC Batch: 146601	QC Batch: 147110	QC Batch: 147237	QC Batch: 147364	QC Batch: 147524
Aluminum	1.7 U	2.0 J	1.7 U				
Antimony	0.0069 U						
Arsenic	0.014 U						
Barium	0.039 U						
Cadmium	0.013 U						
Chromium	0.025 J	0.028 J	0.045 J	0.043 J	0.046 J	0.024 J	0.023 U
Copper	0.026 J	0.026 J	0.023 U	0.023 U	0.030 J	0.023 U	0.023 U
Iron	5.7 U						
Lead	0.021 J	0.0084 U	0.0087 J	0.010 J	0.018 J	0.0084 U	0.0084 U
Manganese	0.028 U	0.035 J	0.037 J	0.028 U	0.039 J	0.035 J	0.028 U
Nickel	0.016 U	0.016 U	0.053 J	0.027 J	0.020 J	0.017 J	0.016 U
Selenium	0.031 U						
Silver	0.0026 U						
Vanadium	0.023 U						
Zinc	0.58 U						

Table 2-2. Sediment Method 6020 Blank Results Summary (mg/Kg) Cont 1

Parameter	QC Batch: 147705	QC Batch: 148095	QC Batch: 148447	QC Batch: 148449	QC Batch: 148608	QC Batch: 148929
Aluminum	1.7 U	1.7 U	1.9 J	2.3 J	1.7 U	2.7 J
Antimony	0.0069 U					
Arsenic	0.014 U					
Barium	0.039 U					
Cadmium	0.013 U					
Chromium	0.023 U	0.027 J	0.080 J	0.032 J	0.032 J	0.038 J
Copper	0.078 J	0.023 U	0.093 J	0.023 U	0.075 J	0.023 U
Iron	5.7 U					
Lead	0.0084 U	0.0084 U	0.0085 J	0.019 J	0.0084 U	0.0084 J
Manganese	0.028 U	0.028 U	0.034 J	0.031 J	0.028 U	0.028 U
Nickel	0.016 U	0.017 J	0.062 J	0.017 J	0.016 U	0.019 J
Selenium	0.031 U					
Silver	0.0026 U					
Vanadium	0.023 U					
Zinc	0.58 U					

Table 2-2. Sediment Method 6020 Blank Results Summary (mg/Kg) Cont 2

Parameter	QC Batch: 148954	QC Batch: 149116	QC Batch: 149117	QC Batch: 149323	QC Batch: 149344	QC Batch: 150029
Aluminum	2.3 J	3.1 J	1.8 J	4.9 J	3.9 J	8.5 J
Antimony	0.0069 U					
Arsenic	0.014 U					
Barium	0.039 U					
Cadmium	0.013 U					
Chromium	0.033 J	0.10	0.033 J	0.044 J	0.036 J	0.025 J
Copper	0.084 J	0.023 U	0.023 U	0.024 J	0.023 U	0.031 J
Iron	5.7 U	6.6 J	5.7 U	5.7 U	5.7 U	5.7 U
Lead	0.012 J	0.012 J	0.0084 J	0.016 J	0.030 J	0.011 J
Manganese	0.028 U	0.057 J	0.028 U	0.028 U	0.028 U	0.028 U
Nickel	0.016 U	0.021 J	0.018 J	0.029 J	0.016 U	0.017 J
Selenium	0.031 U					
Silver	0.0026 U					
Vanadium	0.023 U					
Zinc	0.58 U					

Table 2-3. Water Method 6020 Method Blank Results Summary (µg/L)

<i>Parameter</i>	<i>QC Batch: 200-63833</i>	<i>QC Batch: 200-64333</i>	<i>QC Batch: 200-64891</i>	<i>QC Batch: 200-65650</i>	<i>QC Batch: 200-66515</i>	<i>QC Batch: 200-66579</i>
Aluminum	6.0 U	6.0 U	6.0 U	6.12 J	6.0 U ^	9.51 J
				6.90 J		6.0 U
				7.28 J		6.0 U
Antimony	0.073 U	0.073 U	0.073 U	0.073 U	0.327 J	0.073 U
				0.109 J		0.073 U
				0.073 U		
Arsenic	0.092 U	0.289 J	0.092 U	0.092 U	0.092 U	0.092 U
				0.092 U		0.092 U
Barium	0.42 U					
				0.42 U		0.42 U
Cadmium	0.046 U					
				0.046 U		0.046 U
Chromium	0.11 U	0.11 U	0.11 U	0.517 J	2.35 J	0.300 J
				0.968 J		0.11 U
				0.299 J		
Copper	0.23 U	0.23 U	1.27 J	1.45 J	0.23 U	0.321 J
				0.468 J		0.232 J
				0.391 J		
Iron	8.3 U	8.3 U	72.00 J	9.98 J	8.3 U	8.3 U
				8.3 U		8.3 U
				8.3 U		
Lead	0.024 U	0.024 U	0.024 U	0.0820 J	0.024 U	0.0270 J
				0.0550 J		0.106 J
				0.0250 J		
Manganese	1.0 U					
				1.0 U		1.0 U
				1.0 U		
Nickel	0.63 U					
				0.63 U		0.63 U
				0.63 U		
Selenium	0.347 J	0.594 J	0.32 U ^	0.364 J	0.420 J	0.32 U ^
				0.32 U		0.32 U ^
				0.32 U		
Silver	0.014 U					
				0.0170 J		0.014 U
				0.014 U		
Vanadium	0.30 U	0.30 U	0.30 U	0.30 U	0.925 J	0.30 U
				0.30 U		0.30 U
				0.30 U		
Zinc	1.00 J	9.23 J	2.87 J	2.13 J	2.72 J	12.05 J
				2.89 J		2.25 J
				2.51 J		

Table 2-4. Sediment Method 7471 Blank Results Summary (mg/Kg)

Parameter	Batch	Result
Mercury	146042	0.0033 U
	146198	0.0033 U
	146526	0.0033 U
	146527	0.0033 U
	147350	0.0033 U
	147565	0.0033 U
	147672	0.0033 U
	147673	0.0033 U
	147674	0.0033 U
	148769	0.0033 U
	148770	0.0033 U
	148921	0.0033 U
	148925	0.0033 U
	149143	0.0033 U
	149346	0.0033 U
	149526	0.0033 U
	149806	0.0033 U
	149809	0.0033 U
	149968	0.0033 U
	150204	0.0033 U
150444	0.0033 U	
150831	0.0033 U	

Table 2-5. Water Method 7470 Method Blank Results Summary (µg/L)

Parameter	Batch	Result
Mercury	200-63737	0.050 U
	200-64789	0.050 U
	200-64995	0.050 U
	200-65197	0.0710 J
		0.0640 J
	200-65612	0.050 U
	200-65936	0.0870 J
	200-66217	0.050 U

Table 2-6. Sediment Method 9012 Blank Results Summary (mg/Kg)

Parameter	Batch	Result
Cyanide	146543	0.19 U
	146544	0.27 J
	146545	0.19 U
	146990	0.19 U
	146991	0.19 U
	146992	0.19 U
	147509	0.19 U
	147914	0.19 U
	147915	0.19 U
	147916	0.19 U
	148014	0.19 U
	148549	0.19 U
	148550	0.19 U
	148648	0.19 U
	149050	0.19 U
	149052	0.19 U
	149175	0.19 U
	149987	0.19 U
	150104	0.19 U
	150149	0.19 U
150150	0.19 U	

Table 2-7. Water Method 9012 Method Blank Results Summary (µg/L)

Parameter	Batch	Result
Cyanide, Total	200-64176	1.6 U
	200-64328	1.6 U
	200-64895	1.6 U
	200-65492	1.6 U
	200-65925	1.6 U
	200-66376	1.6 U

Table 2-8. Sediment Lloyd Kahn TOC Blank Results Summary (mg/Kg)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Total Organic Carbon	200-63842	109 U
	200-63939	177.5 J
	200-64178	109 U
	200-64416	300.0 J
	200-64422	149.0 J
	200-64542	155.0 J
	200-64851	125.0 J
		109 U
	200-64918	109 U
	200-65183	145.0 J
	200-65293	385.0 J
	200-65384	400.0 J
	200-65439	565.0 J ^
	200-65517	365.0 J
	200-65584	380.0 J
	200-65663	380.0 J
	200-65706	375.0 J
	200-65760	109 U
	200-65840	109 U
	200-65894	185.0 J
200-65961	109 U	
200-66047	109 U	
200-66190	109 U	

Table 2-9. Sediment Lloyd Kahn Black Carbon Blank Results Summary (mg/Kg)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Black Carbon	200-63898	1000 U
	200-64539	1000 U
	200-65585	1000 U
	200-65841	1000 U
	200-66350	1000 U

2.4 Calibration

Initial instrument calibrations for each of the methods were all within acceptance criteria.

2.4.1 Calibration Verification: Sediment Sample Analyses

Initial instrument calibrations for each of the methods were all well within acceptance criteria. All parameters were calibrated using multi-point curves with appropriate first order regression models applied.

All of the initial calibration verification checks (ICVs) for these analyses met the stated $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the initial calibration verification data.

There was a single instance where the low level calibration verification checks ("CCVLs") performed for these analyses did not meet the $\pm 30\%$ acceptance criterion used by the laboratory and required by the methods. Copper failed at 142%. All associated samples with levels below the CCV value ($100\mu\text{g/L}$) were reported from a different analysis. No data is qualified based on the CCVL.

The laboratory also performed the requisite interference checks (ICS A, ICS AB) with each calibration. All of the interference checks gave acceptable results. Hence, no data are qualified as a consequence of the interference check sample data.

Continuing calibration verification checks were performed at the required frequencies. All of the continuing calibration verification checks (CCVs) for these analyses met the $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the continuing calibration data.

2.4.2 Equipment Blanks Calibration Verification

There were a few instances where the calibration verification checks (ICV/CCVs) performed for these analyses did not meet the $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. Aluminum failed at 89% for the analysis sequence containing samples 120413615 and 120513657. Since all the failures are below the specified limits, the samples will be qualified as estimated with a potential low bias ("J-"). In a single instance the CCV result for selenium exceeded the CCV limit of $\pm 10\%$ at 116% and 113%. Since no selenium was detected in the associated samples, no data will be qualified.

2.5 Laboratory Control Samples

Laboratory control samples (LCS) were analyzed with each of the data sets. The recovery limits used by the laboratory for LCS results are either those given in the method guidance or are based upon laboratory performance. Some of the laboratory control samples were prepared and analyzed multiple times. All results from all analyses are reported. All recoveries for all analytes/all methods were within the specified limits. No data are qualified as a consequence of the LCS results.

Recoveries are given along with the acceptance limits in Tables 2-10 through 2-17.

Table 2-10. Sediment Method 6020 LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 146599			QC Batch: 146600			QC Batch: 146601		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	80	120	500	495	99	500	504	101	500	502	100
Antimony	80	120	50	51.0	102	50	52.0	104	50	52.5	105
Arsenic	80	120	50	50.3	101	50	50.2	100	50	52.6	105
Barium	80	120	50	49.4	99	50	50.3	101	50	48.5	97
Cadmium	80	120	50	52.0	104	50	51.7	103	50	50.4	101
Chromium	80	120	50	48.7	97	50	49.3	99	50	49.2	98
Copper	80	120	50	49.6	99	50	49.9	100	50	49.8	100
Iron	80	120	500	489	98	500	500	100	500	502	100
Lead	80	120	50	48.4	97	50	48.6	97	50	48.4	97
Manganese	80	120	50	48.2	96	50	48.8	98	50	48.9	98
Nickel	80	120	50	49.3	99	50	49.6	99	50	50.9	102
Selenium	80	120	50	52.1	104	50	52.0	104	50	53.3	107
Silver	80	120	25	24.7	99	25	25.3	101	25	24.7	99
Vanadium	80	120	50	48.6	97	50	48.9	98	50	49.0	98
Zinc	80	120	50	50.5	101	50	51.0	102	50	53.9	108

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 1

Parameter	QC Batch: 147110			QC Batch: 147237			QC Batch: 147364		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	487	97	500	505	101	500	502	100
Antimony	50	51.6	103	50	52.0	104	50	51.8	104
Arsenic	50	50.4	101	50	50.2	100	50	51.2	102
Barium	50	49.6	99	50	49.3	99	50	49.3	99
Cadmium	50	52.4	105	50	52.1	104	50	51.4	103
Chromium	50	49.9	100	50	49.2	98	50	49.7	99
Copper	50	50.8	102	50	49.8	100	50	50.2	100
Iron	500	507	101	500	504	101	500	502	100
Lead	50	51.6	103	50	50.0	100	50	52.1	104
Manganese	50	49.2	98	50	49.9	100	50	48.9	98
Nickel	50	50.6	101	50	49.3	99	50	50.1	100
Selenium	50	51.2	102	50	54.3	109	50	51.6	103
Silver	25	25.3	101	25	24.4	98	25	24.9	100
Vanadium	50	50.0	100	50	49.1	98	50	49.4	99
Zinc	50	51.9	104	50	52.9	106	50	52.3	105

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 2

Parameter	QC Batch: 147524			QC Batch: 147705			QC Batch: 148095		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	501	100	500	487	97	500	483	97
Antimony	50	50.9	102	50	50.4	101	50	51.8	104
Arsenic	50	50.8	102	50	49.6	99	50	50.1	100
Barium	50	49.5	99	50	49.0	98	50	49.4	99
Cadmium	50	49.7	99	50	49.1	98	50	50.5	101
Chromium	50	48.7	97	50	48.5	97	50	49.2	98
Copper	50	48.2	96	50	47.5	95	50	49.1	98
Iron	500	499	100	500	486	97	500	490	98
Lead	50	47.6	95	50	48.1	96	50	53.0	106
Manganese	50	49.4	99	50	48.8	98	50	48.9	98
Nickel	50	49.2	98	50	48.5	97	50	49.5	99
Selenium	50	54.6	109	50	52.5	105	50	50.7	101
Silver	25	24.0	96	25	24.2	97	25	24.5	98
Vanadium	50	48.6	97	50	48.4	97	50	49.2	98
Zinc	50	51.0	102	50	49.6	99	50	51.6	103

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 3

Parameter	QC Batch: 148447			QC Batch: 148449			QC Batch: 148608		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	500	100	500	499	100	500	484	97
Antimony	50	51.9	104	50	53.1	106	50	54.1	108
Arsenic	50	51.4	103	50	52.1	104	50	52.0	104
Barium	50	50.4	101	50	50.7	101	50	50.8	102
Cadmium	50	51.6	103	50	51.9	104	50	52.1	104
Chromium	50	50.7	101	50	50.8	102	50	50.2	100
Copper	50	51.2	102	50	51.0	102	50	51.0	102
Iron	500	495	99	500	495	99	500	488	98
Lead	50	53.5	107	50	54.6	109	50	51.9	104
Manganese	50	50.0	100	50	49.8	100	50	50.0	100
Nickel	50	51.4	103	50	51.6	103	50	50.4	101
Selenium	50	54.0	108	50	54.3	109	50	52.4	105
Silver	25	25.5	102	25	25.6	102	25	25.4	102
Vanadium	50	50.3	101	50	50.7	101	50	50.2	100
Zinc	50	51.8	104	50	51.8	104	50	51.9	104

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 4

Parameter	QC Batch: 148929			QC Batch: 148954			QC Batch: 149116		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	495	99	500	498	100	500	503	101
Antimony	50	54.2	108	50	50.7	101	50	54.0	108
Arsenic	50	51.7	103	50	49.6	99	50	50.8	102
Barium	50	50.6	101	50	48.8	98	50	50.2	100
Cadmium	50	53.7	107	50	50.8	102	50	53.3	107
Chromium	50	49.3	99	50	48.8	98	50	49.6	99
Copper	50	50.4	101	50	48.8	98	50	49.9	100
Iron	500	492	98	500	483	97	500	497	99
Lead	50	55.8	112	50	50.4	101	50	54.6	109
Manganese	50	49.4	99	50	48.0	96	50	48.5	97
Nickel	50	50.6	101	50	48.9	98	50	49.6	99
Selenium	50	53.8	108	50	50.9	102	50	52.8	106
Silver	25	25.6	103	25	24.6	98	25	25.4	102
Vanadium	50	50.0	100	50	48.6	97	50	49.6	99
Zinc	50	52.2	104	50	49.9	100	50	52.1	104

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 5

Parameter	QC Batch: 149117			QC Batch: 149323			QC Batch: 149344		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	499	100	500	503	101	500	505	101
Antimony	50	50.1	100	50	51.8	104	50	51.2	102
Arsenic	50	50.2	100	50	51.3	103	50	51.4	103
Barium	50	48.2	96	50	49.7	99	50	50.1	100
Cadmium	50	51.0	102	50	52.2	104	50	52.6	105
Chromium	50	49.3	99	50	50.1	100	50	50.8	102
Copper	50	50.0	100	50	50.0	100	50	51.0	102
Iron	500	499	100	500	503	101	500	504	101
Lead	50	51.8	104	50	54.2	108	50	53.3	107
Manganese	50	48.6	97	50	49.6	99	50	49.6	99
Nickel	50	50.1	100	50	50.2	100	50	50.8	102
Selenium	50	50.6	101	50	54.0	108	50	51.8	104
Silver	25	24.9	100	25	25.2	101	25	25.7	103
Vanadium	50	49.0	98	50	50.1	100	50	50.2	100
Zinc	50	50.9	102	50	52.2	104	50	51.4	103

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 6

Parameter	QC Batch: 150029		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	500	100
Antimony	50	50.5	101
Arsenic	50	50.5	101
Barium	50	48.9	98
Cadmium	50	50.9	102
Chromium	50	49.4	99
Copper	50	50.0	100
Iron	500	497	99
Lead	50	53.3	107
Manganese	50	48.8	98
Nickel	50	51.0	102
Selenium	50	51.9	104
Silver	25	24.9	100
Vanadium	50	49.2	98
Zinc	50	50.9	102

Table 2-11. Water Method 6020 LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 200-63833			QC Batch: 200-64333			QC Batch: 200-64891		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
Aluminum	80	120	1000	1020	102	1000	1005	100	1000	1024	102
Antimony	80	120	50.0	52.61	105	50.0	52.02	104	50.0	51.10	102
Arsenic	80	120	25.0	25.97	104	25.0	27.11	108	25.0	23.82	95
Barium	80	120	1250	1269	101	1250	1209	97	1250	1286	103
Cadmium	80	120	25.0	26.85	107	25.0	26.14	105	25.0	24.63	99
Chromium	80	120	50.0	52.53	105	50.0	49.43	99	50.0	49.50	99
Copper	80	120	50.0	53.26	107	50.0	51.94	104	50.0	52.85	106
Iron	80	120	2500	2454	98	2500	2437	97	2500	2608	104
Lead	80	120	25.0	26.35	105	25.0	24.93	100	25.0	25.22	101
Manganese	80	120	50.0	51.53	103	50.0	49.97	100	50.0	51.66	103
Nickel	80	120	50.0	53.38	107	50.0	49.73	99	50.0	52.45	105
Selenium	80	120	25.0	25.23	101	25.0	28.67	115	25.0	25.08 ^	100
Silver	80	120	25.0	25.81	103	25.0	25.13	101	25.0	25.15	101
Vanadium	80	120	50.0	53.09	106	50.0	49.87	100	50.0	50.71	101
Zinc	80	120	50.0	51.57	103	50.0	53.14	106	50.0	51.14	102

Table 2-11. Water Method 6020 LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 200-65650			QC Batch: 200-66515			QC Batch: 200-66579		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
Aluminum	80	120	1000	1063	106	1000	942.6 ^	94	1000	1055	106
	80	120	1000	1096	110				1000	1023	102
	80	120	1000	1023	102				1000	1044	104
Antimony	80	120	50.0	51.26	103	50.0	45.98	92	50.0	49.60	99
	80	120	50.0	50.36	101				50.0	49.52	99
	80	120	50.0	46.52	93						
Arsenic	80	120	25.0	25.36	101	25.0	24.37	97	25.0	24.19	97
	80	120	25.0	25.30	101				25.0	26.01	104
	80	120	25.0	23.78	95						
Barium	80	120	1250	1310	105	1250	1190	95	1250	1315	105
	80	120	1250	1291	103				1250	1279	102
	80	120	1250	1196	96						
Cadmium	80	120	25.0	26.15	105	25.0	24.35	97	25.0	26.16	105
	80	120	25.0	25.80	103				25.0	26.12	104
	80	120	25.0	24.13	97						
Chromium	80	120	50.0	51.81	104	50.0	53.85	108	50.0	52.81	106
	80	120	50.0	50.70	101				50.0	52.50	105
	80	120	50.0	47.13	94						
Copper	80	120	50.0	56.36	113	50.0	50.41	101	50.0	55.77	112
	80	120	50.0	54.68	109				50.0	55.79	112
	80	120	50.0	50.07	100						
Iron	80	120	2500	2835	113	2500	2599	104	2500	2731	109
	80	120	2500	2777	111				2500	2817	113
	80	120	2500	2558	102						
Lead	80	120	25.0	25.96	104	25.0	25.60	102	25.0	25.69	103
	80	120	25.0	25.61	102				25.0	25.36	101
	80	120	25.0	24.33	97						
Manganese	80	120	50.0	52.10	104	50.0	54.59	109	50.0	53.25	107
	80	120	50.0	51.12	102				50.0	56.60	113
	80	120	50.0	47.12	94						
Nickel	80	120	50.0	53.92	108	50.0	50.12	100	50.0	53.51	107
	80	120	50.0	53.19	106				50.0	53.50	107
	80	120	50.0	49.06	98						
Selenium	80	120	25.0	26.58	106	25.0	25.09	100	25.0	23.79 ^	95
	80	120	25.0	25.62	102				25.0	26.64 ^	107
	80	120	25.0	23.75	95						
Silver	80	120	25.0	26.08	104	25.0	23.99	96	25.0	26.73	107
	80	120	25.0	26.11	104				25.0	25.79	103
	80	120	25.0	25.37	101						
Vanadium	80	120	50.0	52.84	106	50.0	55.81	112	50.0	54.48	109
	80	120	50.0	52.15	104				50.0	54.30	109
	80	120	50.0	48.73	97						
Zinc	80	120	50.0	55.14	110	50.0	53.03	106	50.0	52.55	105
	80	120	50.0	52.04	104				50.0	54.60	109
	80	120	50.0	46.94	94						

Table 2-12. Sediment Method 7471 LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (mg/kg)	Result (mg/kg)	Rec (%)
		Lower	Upper			
146042	Mercury	85	115	.17	0.15	91
146198	Mercury	85	115	.17	0.16	99
146526	Mercury	85	115	.17	0.16	99
146527	Mercury	85	115	.17	0.16	99
147350	Mercury	85	115	.17	0.15	93
147565	Mercury	85	115	.17	0.16	95
147672	Mercury	85	115	.17	0.16	98
147673	Mercury	85	115	.17	0.17	100
147674	Mercury	85	115	.17	0.16	96
148769	Mercury	85	115	.17	0.17	100
148770	Mercury	85	115	.17	0.16	99
148921	Mercury	85	115	.17	0.16	98
148925	Mercury	85	115	.17	0.16	99
149143	Mercury	85	115	.17	0.16	97
149346	Mercury	85	115	.17	0.16	98
149526	Mercury	85	115	.17	0.17	102
149806	Mercury	85	115	.17	0.16	99
149809	Mercury	85	115	.17	0.17	102
149968	Mercury	85	115	.17	0.17	104
150204	Mercury	85	115	.17	0.18	105
150444	Mercury	85	115	.17	0.15	92
150831	Mercury	85	115	.17	0.18	108

Table 2-13. Water Method 7470 LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (µg/L)	Result (µg/L)	Rec (%)
		Lower	Upper			
200-63737	Mercury	85	115	1.00	1.05	105
200-64789	Mercury	85	115	1.00	0.939	94
200-64995	Mercury	85	115	1.00	1.00	100
200-65197	Mercury	85	115	1.00	1.02	102
		85	115	1.00	1.01	101
200-65612	Mercury	85	115	1.00	0.961	96
200-65936	Mercury	85	115	1.00	0.888	89
200-66217	Mercury	85	115	1.00	0.873	87

Table 2-14. Sediment Method 9012 LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (mg/kg)	Result (mg/kg)	Rec (%)
		Lower	Upper			
146543	Cyanide	80	120	3	3.0	99
146544	Cyanide	80	120	3	3.0	101
146545	Cyanide	80	120	3	3.0	101
146990	Cyanide	80	120	3	3.0	99
146991	Cyanide	80	120	3	2.9	98
146992	Cyanide	80	120	3	3.0	100
147509	Cyanide	80	120	3	3.3	111
147914	Cyanide	80	120	3	2.9	98
147915	Cyanide	80	120	3	3.0	102
147916	Cyanide	80	120	3	3.0	101
148014	Cyanide	80	120	3	3.0	100
148549	Cyanide	80	120	3	3.0	101
148550	Cyanide	80	120	3	2.9	98
148648	Cyanide	80	120	3	3.0	102
149050	Cyanide	80	120	3	3.0	101
149052	Cyanide	80	120	3	3.0	99
149175	Cyanide	80	120	3	3.0	100
149987	Cyanide	80	120	3	3.2	107
150104	Cyanide	80	120	3	2.6	86
150149	Cyanide	80	120	3	3.0	101
150150	Cyanide	80	120	3	3.1	103

Table 2-15. Water Method 9012 LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (µg/L)	Result (µg/L)	Rec (%)
		Lower	Upper			
200-64176	Cyanide, Total	85	115	120	122.3	102
200-64328	Cyanide, Total	85	115	120	120.9	101
200-64895	Cyanide, Total	85	115	120	119.6	100
200-65492	Cyanide, Total	85	115	120	120.1	100
200-65925	Cyanide, Total	85	115	120	120.3	100
200-66376	Cyanide, Total	85	115	120	119.6	100

Table 2-16. Sediment Lloyd Kahn TOC LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (mg/kg)	Result (mg/kg)	Rec (%)
		Lower	Upper			
200-63842	Total Organic Carbon	75	125	20100	19860	99
200-63939	Total Organic Carbon	75	125	20100	19480	97
200-64178	Total Organic Carbon	75	125	20100	21630	108
200-64416	Total Organic Carbon	75	125	20100	20990	104
200-64422	Total Organic Carbon	75	125	20100	19770	98
200-64542	Total Organic Carbon	75	125	20100	21550	107
200-64851	Total Organic Carbon	75	125	20100	20090	100
		75	125	20100	21340	106
200-64918	Total Organic Carbon	75	125	20100	20190	100
200-65183	Total Organic Carbon	75	125	20100	19110	95
200-65293	Total Organic Carbon	75	125	20100	20370	101
200-65384	Total Organic Carbon	75	125	20100	19620	98
200-65439	Total Organic Carbon	75	125	20100	19600 ^	98
200-65517	Total Organic Carbon	75	125	20100	20390	101
200-65584	Total Organic Carbon	75	125	20100	21140	105
200-65663	Total Organic Carbon	75	125	20100	20410	102
200-65706	Total Organic Carbon	75	125	20100	20270	101
200-65760	Total Organic Carbon	75	125	20100	20340	101
200-65840	Total Organic Carbon	75	125	20100	18790	93
200-65894	Total Organic Carbon	75	125	20100	21110	105
200-65961	Total Organic Carbon	75	125	20100	19260	96
200-66047	Total Organic Carbon	75	125	20100	19940	99
200-66190	Total Organic Carbon	75	125	20100	20940	104

Table 2-17. Sediment Lloyd Kahn Black Carbon LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (mg/kg)	Result (mg/kg)	Rec (%)
		Lower	Upper			
200-63898	Black Carbon	50	150	9900	10310	104
200-64539	Black Carbon	50	150	9900	9445	95
200-65585	Black Carbon	50	150	9900	8280	84
200-65841	Black Carbon	50	150	9900	11790	119
200-66350	Black Carbon	50	150	9900	8335	84

2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were evaluated for each of the parameters at appropriate frequencies.

It is important to note all matrix spike analyses on water samples were performed using equipment blanks.

Most MS/MSDs failed to recover within the acceptance limits for multiple analytes. In some cases, the failures were assignable to a low spike concentration relative to the amount present in the parent sample (i.e., sample amount exceeded 4x the spike concentration). Such circumstances do not merit qualification of the data. All MS/MSD samples analyzed using ICP-MS had post digestion spikes analyzed that fell within the acceptable range of recovery. For ICP-MS results:

- Results associated with recoveries less than 75% will be qualified as estimated ("J") above the MDL, and estimated as ("UJ") for non-detects,
- Results associated with recoveries greater than 125%, will be qualified as estimated ("J") for results above the MDL.

For available cyanide and mercury results:

- Results associated with recoveries less than 30%, will be qualified as estimated low ("J-") for results greater than the MDL and non-detects as unusable ("R"),
- Results associated with recoveries between 30-74% will be qualified as estimated low ("J-") for results above the MDL as and non-detects qualified as estimated ("UJ"),
- Results associated with recoveries above 125% will be qualified as estimated high ("J+") for results above the MDL.

Total organic carbon failures will be qualified as estimated ("J"). All qualifications will be for the parent sample and MS/MSD only.

The MS/MSD data are given in Tables 2-18 through 2-23.

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 102913343

Parameter	MS Sample ID: 102913343			MSD Sample ID: 102913343			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	604	19300	779	604	19300	778	0	14600 P6	20
Antimony	60.4	21.5	35	60.4	21.1	34	2	0.33 JD3, M0	20
Arsenic	60.4	73.3	103	60.4	71.3	100	3	11.2	20
Barium	60.4	113	119	60.4	112	118	1	41.1	20
Cadmium	60.4	63.1	104	60.4	61.5	102	3	0.19 JD3	20
Chromium	60.4	87.9	105	60.4	87.7	105	0	24.4	20
Copper	60.4	98.3	111	60.4	90.6	98	8	31.3	20
Iron	604	27500	384	604	26300	194	4	25200 P6	20
Lead	60.4	76.2	100	60.4	75.6	100	1	15.5	20
Manganese	60.4	485	109	60.4	468	81	4	419	20
Nickel	60.4	96.5	99	60.4	95.5	98	1	36.5	20
Selenium	60.4	65.3	105	60.4	63.9	103	2	1.6	20
Silver	30.3	29.2	96	30.3	28.9	96	1	0.043 JD3	20
Vanadium	60.4	98.1	111	60.4	97.1	109	1	31.3	20
Zinc	60.4	118	93	60.4	117	92	1	61.7	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 102813277

Parameter	MS Sample ID: 102813277			MSD Sample ID: 102813277			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	582	16900	822	582	16800	804	1	12100 P6	20
Antimony	58.2	25.2	43	58.2	24.7	42	2	0.30 JD3, M0	20
Arsenic	58.2	71.8	104	58.2	70.6	101	2	11.5	20
Barium	58.2	103	115	58.2	103	116	0	35.9	20
Cadmium	58.2	60.6	104	58.2	60	103	1	0.15 UD3	20
Chromium	58.2	83.0	107	58.2	82.8	107	0	20.8	20
Copper	58.2	91.1	102	58.2	92.9	105	2	31.9	20
Iron	582	26700	466	582	25500	270	4	24000 P6	20
Lead	58.2	75.6	61	58.2	76	61	0	40.2 M0	20
Manganese	58.2	474	96	58.2	475	99	0	417	20
Nickel	58.2	94.1	102	58.2	92	99	2	34.5	20
Selenium	58.2	62.4	104	58.2	62.1	104	1	1.8	20
Silver	29.1	28.5	98	29.1	28.4	98	0	0.031 UD3	20
Vanadium	58.2	91.2	111	58.2	89.4	107	2	26.8	20
Zinc	58.2	116	94	58.2	119	100	3	60.6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 110113376

Parameter	MS Sample ID: 110113376			MSD Sample ID: 110113376			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1170	17200	390	1170	18300	483	6	12600 P6	20
Antimony	117	73.3	59	117	76.9	61	5	4.9 M0	20
Arsenic	117	136	101	117	139	103	2	18	20
Barium	117	652	94	117	700	135	7	542 P6	20
Cadmium	117	190	104	117	201	113	6	68.3	20
Chromium	117	912	124	117	965	169	6	766 P6	20
Copper	117	704	141	117	704	140	0	540 P6	20
Iron	1170	26800	60	1170	29000	245	8	26100 P6	20
Lead	117	1240	191	117	1180	143	5	1010 P6	20
Manganese	117	446	92	117	469	112	5	338	20
Nickel	117	351	120	117	345	113	2	211	20
Selenium	117	118	98	117	119	98	1	4	20
Silver	58.3	84.3	100	58.3	80	92	5	25.9	20
Vanadium	117	128	102	117	131	103	2	9.9	20
Zinc	117	2980	226	117	2970	214	0	2720 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 110413458

Parameter	MS Sample ID: 110413458			MSD Sample ID: 110413458			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	566	16400	1190	566	16400	1180	0	9730 P6	20
Antimony	56.6	28.5	49	56.6	27.1	47	5	0.59 JD3, M0	20
Arsenic	56.6	69.5	97	56.6	67.8	95	2	14.4	20
Barium	56.6	104	127	56.6	106	131	2	32.3 M0	20
Cadmium	56.6	57.9	102	56.6	57.1	101	1	1.1 UD3	20
Chromium	56.6	80.1	112	56.6	81.1	115	1	16.4	20
Copper	56.6	165	232	56.6	88.2	96	61	33.9 M0, R1	20
Iron	566	25600	932	566	24800	784	3	20300 P6	20
Lead	56.6	75.3	-3770	56.6	76.5	-3790	2	2210 P6	20
Manganese	56.6	463	127	56.6	481	159	4	391 P6	20
Nickel	56.6	91.8	113	56.6	90.2	110	2	27.9	20
Selenium	56.6	61.2	106	56.6	60.8	105	1	1.4	20
Silver	28.3	26.9	95	28.3	26.6	94	1	0.086 JD3	20
Vanadium	56.6	89.1	118	56.6	88.1	117	1	22.2	20
Zinc	56.6	118	142	56.6	126	156	6	37.7 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111113038

Parameter	MS Sample ID: 111113038			MSD Sample ID: 111113038			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	624	20300	898	624	20200	887	0	14700 P6	20
Antimony	62.4	29.2	46	62.4	28.7	46	1	0.29 JD3, M0	20
Arsenic	62.4	69.2	91	62.4	71.1	95	3	12.1	20
Barium	62.4	128	122	62.4	127	121	1	52	20
Cadmium	62.4	61.4	98	62.4	60.6	97	1	1.2 UD3	20
Chromium	62.4	93.6	111	62.4	89.5	105	5	24.3	20
Copper	62.4	97.2	102	62.4	93	96	4	33.4	20
Iron	624	27500	104	624	28200	229	3	26800 P6	20
Lead	62.4	85.9	109	62.4	81.1	102	6	17.9	20
Manganese	62.4	472	-43	62.4	463	-57	2	499 P6	20
Nickel	62.4	97.6	99	62.4	96.1	97	2	36	20
Selenium	62.4	67.4	104	62.4	66.1	102	2	2.4	20
Silver	31.2	29.1	93	31.2	28.8	93	1	0.034 JD3	20
Vanadium	62.4	101	109	62.4	99.3	107	1	32.6	20
Zinc	62.4	139	127	62.4	128	109	9	59.9 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111313092

Parameter	MS Sample ID: 111313092			MSD Sample ID: 111313092			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	582	15500	594	582	15400	574	1	12000 P6	20
Antimony	58.2	28.8	49	58.2	29.1	49	1	0.54 JD3, M0	20
Arsenic	58.2	71.3	101	58.2	70.5	99	1	12.6	20
Barium	58.2	104	110	58.2	108	116	4	39.8	20
Cadmium	58.2	58.6	100	58.2	59.7	102	2	0.41 JD3	20
Chromium	58.2	79.8	97	58.2	83.4	103	4	23.2	20
Copper	58.2	90.9	86	58.2	96.7	95	6	41.1	20
Iron	582	24900	-37	582	24900	-51	0	25200 P6	20
Lead	58.2	75.0	83	58.2	84.9	100	12	26.6	20
Manganese	58.2	519	161	58.2	512	148	1	425 P6	20
Nickel	58.2	92.4	95	58.2	91.9	94	1	36.9	20
Selenium	58.2	59.8	100	58.2	60.2	100	1	1.6	20
Silver	29.1	27.8	95	29.1	28	96	1	0.14 JD3	20
Vanadium	58.2	88.9	106	58.2	89.4	106	1	27.2	20
Zinc	58.2	129	100	58.2	145	126	11	70.9 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111513200

Parameter	MS Sample ID: 111513200			MSD Sample ID: 111513200			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1380	23100	395	1380	23200	410	1	17600 P6	20
Antimony	138	91.1	63	138	90.8	63	0	3.9 M0	20
Arsenic	138	154	103	138	153	102	1	12.7	20
Barium	138	579	104	138	581	106	0	436	20
Cadmium	138	212	96	138	216	101	2	78.4	20
Chromium	138	664	68	138	686	85	3	570 P6	20
Copper	138	696	66	138	718	82	3	606 P6	20
Iron	1380	28100	120	1380	28100	126	0	26400 P6	20
Lead	138	1060	-1	138	969	-65	9	1060 P6	20
Manganese	138	540	147	138	472	98	14	337 M0	20
Nickel	138	347	88	138	355	95	2	225	20
Selenium	138	153	108	138	145	103	5	3.8	20
Silver	69.2	94.7	97	69.2	98.8	103	4	27.8	20
Vanadium	138	168	108	138	164	107	2	17.8	20
Zinc	138	2170	44	138	2200	71	2	2110 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111813252

Parameter	MS Sample ID: 111813252			MSD Sample ID: 111813252			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	621	21000	777	621	21000	773	0	16200 P6	20
Antimony	62.1	31.2	49	62.1	29.6	46	5	0.45 JD3, M0	20
Arsenic	62.1	74.9	104	62.1	73.9	102	1	10.3	20
Barium	62.1	127	119	62.1	128	120	1	52.8	20
Cadmium	62.1	63.9	102	62.1	63.7	101	0	0.20 JD3	20
Chromium	62.1	92.8	105	62.1	93.9	106	1	27.6	20
Copper	62.1	91.8	98	62.1	90.2	94	2	31.1	20
Iron	621	27600	290	621	26200	63	5	25800 P6	20
Lead	62.1	76.9	99	62.1	76.6	98	0	15.4	20
Manganese	62.1	458	82	62.1	462	88	1	407	20
Nickel	62.1	102	100	62.1	101	98	1	39.5	20
Selenium	62.1	66.9	105	62.1	68.1	106	2	1.6	20
Silver	31.1	30.6	98	31.1	30.6	98	0	0.091 JD3	20
Vanadium	62.1	105	112	62.1	104	111	0	35.3	20
Zinc	62.1	124	102	62.1	133	114	7	61.1	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111913305

Parameter	MS Sample ID: 111913305			MSD Sample ID: 111913305			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	770	24400	650	770	24900	724	2	19400 P6	20
Antimony	77	32.8	42	77	31.2	40	5	0.44 JD3, M0	20
Arsenic	77	94.5	108	77	90	102	5	11.5	20
Barium	77	159	109	77	161	112	1	75.3	20
Cadmium	77	79.0	102	77	76.5	99	3	0.23 JD3	20
Chromium	77	116	106	77	114	104	2	34.2	20
Copper	77	119	106	77	112	98	6	36.7	20
Iron	770	33400	451	770	31300	180	6	29900 P6	20
Lead	77	101	107	77	97.5	103	3	18.5	20
Manganese	77	585	94	77	571	76	2	513	20
Nickel	77	127	105	77	121	98	5	45.8	20
Selenium	77	79.8	100	77	80.6	101	1	2.9	20
Silver	38.6	37.8	98	38.6	36.8	96	3	0.12 JD3	20
Vanadium	77	127	111	77	126	110	1	41.6	20
Zinc	77	153	104	77	148	99	3	72.2	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 112013358

Parameter	MS Sample ID: 112013358			MSD Sample ID: 112013358			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	632	20600	745	632	20600	753	0	15900 P6	20
Antimony	63.2	32.8	51	63.2	33.1	51	1	0.73 JD3, M0	20
Arsenic	63.2	75.6	103	63.2	75.8	103	0	10.3	20
Barium	63.2	133	117	63.2	136	122	3	58.5	20
Cadmium	63.2	66.9	105	63.2	67.5	105	1	0.56 JD3	20
Chromium	63.2	92.9	97	63.2	94.3	99	1	31.7	20
Copper	63.2	98.9	108	63.2	95	101	4	30.8	20
Iron	632	26600	184	632	26400	158	1	25400 P6	20
Lead	63.2	82.1	104	63.2	83.6	106	2	16.2	20
Manganese	63.2	475	99	63.2	486	116	2	413	20
Nickel	63.2	101	100	63.2	102	100	1	38.5	20
Selenium	63.2	70.2	107	63.2	70.6	107	0	2.7	20
Silver	31.6	31.3	98	31.6	31.2	97	0	0.31 JD3	20
Vanadium	63.2	104	108	63.2	105	110	2	35.6	20
Zinc	63.2	125	101	63.2	147	134	16	61.4 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 112213427

Parameter	MS Sample ID: 112213427			MSD Sample ID: 112213427			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1350	24300	435	1350	22500	303	8	18400 P6	20
Antimony	135	86.3	62	135	88.8	64	3	2.3 JD3, M0	20
Arsenic	135	145	100	135	145	100	0	10.4	20
Barium	135	463	100	135	445	86	4	329	20
Cadmium	135	158	101	135	153	98	3	21.8	20
Chromium	135	294	93	135	270	75	8	169	20
Copper	135	439	93	135	427	84	3	313	20
Iron	1350	28100	156	1350	25900	-4	8	26000 P6	20
Lead	135	412	81	135	389	64	6	303	20
Manganese	135	516	104	135	502	93	3	376	20
Nickel	135	194	96	135	180	85	8	65.1	20
Selenium	135	143	103	135	141	101	2	5.1	20
Silver	67.3	83.4	97	67.3	78.7	90	6	18.2	20
Vanadium	135	170	106	135	163	101	4	27.9	20
Zinc	135	1260	56	135	1190	10	5	1180 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 112613492

Parameter	MS Sample ID: 112613492			MSD Sample ID: 112613492			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1240	23200	514	1240	24000	580	4	16800 P6	20
Antimony	124	79.0	62	124	77.3	61	2	1.8 JD3, M0	20
Arsenic	124	134	102	124	135	102	1	8.0	20
Barium	124	402	118	124	406	122	1	255	20
Cadmium	124	143	106	124	146	108	2	11.3	20
Chromium	124	268	122	124	271	124	1	117	20
Copper	124	400	119	124	400	119	0	253	20
Iron	1240	26700	228	1240	26600	220	0	23800 P6	20
Lead	124	365	109	124	364	109	0	229	20
Manganese	124	462	97	124	454	91	2	341	20
Nickel	124	186	107	124	189	109	1	53.9	20
Selenium	124	128	101	124	129	102	0	2.6	20
Silver	61.9	77.4	102	61.9	79.2	105	2	14.3	20
Vanadium	124	157	104	124	160	106	2	28.4	20
Zinc	124	1110	182	124	1110	186	0	880 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 120213560

Parameter	MS Sample ID: 120213560			MSD Sample ID: 120213560			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	627	21300	820	627	21600	869	1	16100 P6	20
Antimony	62.7	28.7	45	62.7	28.8	45	0	0.55 JD3, M0	20
Arsenic	62.7	72.6	101	62.7	73.5	102	1	9.2	20
Barium	62.7	139	120	62.7	138	118	1	64.4	20
Cadmium	62.7	65.2	104	62.7	64.6	103	1	0.17 JD3	20
Chromium	62.7	96.1	108	62.7	94.5	105	2	28.3	20
Copper	62.7	94.0	105	62.7	92.4	102	2	28.4	20
Iron	627	27100	252	627	27100	264	0	25500 P6	20
Lead	62.7	82.6	95	62.7	78.4	89	5	22.8	20
Manganese	62.7	474	-74	62.7	474	-73	0	520 P6	20
Nickel	62.7	100	99	62.7	102	102	2	37.8	20
Selenium	62.7	66.9	104	62.7	67.8	106	1	1.5	20
Silver	31.4	30.7	98	31.4	30.5	97	0	0.064 JD3	20
Vanadium	62.7	104	110	62.7	105	111	1	34.9	20
Zinc	62.7	135	115	62.7	123	97	9	62.4	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 120413619

Parameter	MS Sample ID: 120413619			MSD Sample ID: 120413619			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1270	23700	444	1270	24000	472	1	18000 P6	20
Antimony	127	77.6	59	127	74.7	57	4	2.6 M0	20
Arsenic	127	139	101	127	139	102	0	10	20
Barium	127	491	105	127	501	114	2	358	20
Cadmium	127	180	105	127	180	105	0	47.0	20
Chromium	127	440	105	127	446	110	1	307	20
Copper	127	580	114	127	575	111	1	435	20
Iron	1270	27300	136	1270	27100	116	1	25600 P6	20
Lead	127	568	108	127	596	131	5	431 M0	20
Manganese	127	454	98	127	448	95	1	329	20
Nickel	127	274	102	127	281	109	3	144	20
Selenium	127	131	100	127	131	101	0	3.3	20
Silver	63.4	90.3	101	63.4	90.4	102	0	26.4	20
Vanadium	127	158	105	127	160	107	1	24.9	20
Zinc	127	1630	110	127	1640	120	1	1490	20

Table 2-19. Water Method 6020 MS Recoveries

Sample ID	Parameter	Spike (µg/L)	MS Result (µg/L)	Rec (%)	Lab Sample Result (µg/L)
102913290	Aluminum	1000	1063	106	6.0 U
	Antimony	50.0	53.75	108	20.0 U
	Arsenic	25.0	27.40	110	2.0 U
	Barium	1250	1306	104	0.57 J
	Cadmium	25.0	27.79	111	2.0 U
	Chromium	50.0	54.72	109	4.0 U
	Copper	50.0	54.78	110	20.0 U
	Iron	2500	2540	102	8.3 U
	Lead	25.0	27.10	108	0.037 J
	Manganese	50.0	53.06	106	1.0 U
	Nickel	50.0	54.96	110	0.63 U
	Selenium	25.0	27.19	109	2.0 U
	Silver	25.0	26.72	107	2.0 U
	Vanadium	50.0	55.21	110	4.0 U
	Zinc	50.0	54.38	105	1.9 J B
	112513451	Aluminum	1000	1028	100
Antimony		50.0	45.61	91	20.0 U
Arsenic		25.0	23.48	94	2.0 U
Barium		1250	1184	95	1.3 J
Cadmium		25.0	23.65	95	2.0 U
Chromium		50.0	46.27	92	0.27 J
Copper		50.0	49.41	98	0.60 J
Iron		2500	2536	101	19.2 J
Lead		25.0	24.12	96	0.12 J
Manganese		50.0	46.62	93	1.0 U
Nickel		50.0	47.84	96	0.63 U
Selenium		25.0	22.96	92	2.0 U
Silver		25.0	25.30	101	2.0 U
Vanadium		50.0	47.44	95	4.0 U
Zinc		50.0	45.62	86	2.5 J
120513657		Aluminum	1000	985.9 ^	96
	Antimony	50.0	47.91	96	0.12 J B
	Arsenic	25.0	25.17	100	0.17 J
	Barium	1250	1249	100	100 U
	Cadmium	25.0	25.46	102	2.0 U
	Chromium	50.0	54.43	103	2.7 J B
	Copper	50.0	51.88	102	0.64 J
	Iron	2500	2661	105	46.6 J
	Lead	25.0	26.86	107	2.0 U

Sample ID	Parameter	Spike (µg/L)	MS Result (µg/L)	Rec (%)	Lab Sample Result (µg/L)
	Manganese	50.0	55.36	111	1.0 U
	Nickel	50.0	50.99	102	0.63 U
	Selenium	25.0	25.42	100	0.37 J B
	Silver	25.0	25.26	101	2.0 U
	Vanadium	50.0	57.00	111	1.6 J B
	Zinc	50.0	52.63	100	2.5 J B
120213518	Aluminum	1000	2094 F	36	1730 B
	Antimony	50.0	45.28	91	20.0 U
	Arsenic	25.0	23.35	93	2.0 U
	Barium	1250	1221	97	10.3 J
	Cadmium	25.0	24.28	97	2.0 U
	Chromium	50.0	52.27	98	3.2 J B
	Copper	50.0	54.81	103	3.4 J B
	Iron	2500	4298	90	2050
	Lead	25.0	25.77	95	2.0 B
	Manganese	50.0	88.02	94	40.9
	Nickel	50.0	52.37	99	2.7 J
	Selenium	25.0	22.59 ^	90	2.0 U ^
	Silver	25.0	24.46	98	0.016 J
	Vanadium	50.0	53.39	102	2.3 J
	Zinc	50.0	56.12	91	10.5 J B
120613843	Aluminum	1000	1029	101	22.8 J
	Antimony	50.0	49.37	99	20.0 U
	Arsenic	25.0	24.83	99	2.0 U
	Barium	1250	1277	102	100 U
	Cadmium	25.0	26.11	104	2.0 U
	Chromium	50.0	50.53	101	4.0 U
	Copper	50.0	53.51	106	0.29 J B
	Iron	2500	2666	106	16.3 J
	Lead	25.0	24.60	98	0.11 J B
	Manganese	50.0	51.64	103	1.0 U
	Nickel	50.0	52.00	104	0.63 U
	Selenium	25.0	25.42 ^	102	2.0 U ^
	Silver	25.0	25.94	104	2.0 U
	Vanadium	50.0	52.72	105	4.0 U
	Zinc	50.0	52.27	99	2.5 J B

Table 2-20. Sediment Method 7471 MS/MSD Recoveries

Sample ID	Parameter	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)	RPD	Lab Sample Result (mg/kg)	Max RPD
102813277	Mercury	.2	0.19	71	.2	0.2	72	1	0.055 M0	20
110113376	Mercury	.4	5.5	306	.4	5.5	317	1	4.3 P6	20
110413458	Mercury	.19	0.21	97	.19	0.2	94	3	0.026	20
110413434	Mercury	.38	3.5	-143	.38	4	-14	13	4 P6	20
111113038	Mercury	.21	0.23	99	.21	0.22	96	3	0.021	20
111213062	Mercury	.35	3.4	68	.35	3.5	100	3	3.2 P6	20
111313092	Mercury	.2	0.21	98	.2	0.21	97	1	0.021	20
111513200	Mercury	.47	3.3	214	.47	3	147	10	2.4 P6	20
111813252	Mercury	.21	0.22	97	.21	0.24	103	6	0.022	20
111913305	Mercury	.26	0.27	96	.26	0.27	96	0	0.024	20
112013358	Mercury	.22	0.22	97	.22	0.23	98	2	0.020	20
112213427	Mercury	.43	2.5	160	.43	2.2	76	16	1.8 P6	20
112213443	Mercury	.38	4.9	63	.38	5.4	210	11	4.6 P6	20
112613492	Mercury	.42	2.8	333	.42	2.1	167	29	1.4 M0, R1	20
120213522	Mercury	.57	3.6	299	.57	2.9	176	21	1.9 M0, R1	20
120213560	Mercury	.21	0.23	99	.21	0.23	101	1	0.023	20
120413619	Mercury	.41	2.4	148	.41	2.3	119	5	1.8 P6	20
120613845	Mercury	.29	2.4	-152	.29	3.3	163	32	2.8 P6, R1	20

Table 2-21. Water Method 7470 MS Recoveries

Sample ID	Parameter	Spike (µg/L)	MS Result (µg/L)	Rec (%)	Lab Sample Result (µg/L)
110113373	Mercury	1.00	0.980	98	0.20 U
111513157	Mercury	1.00	0.998	93	0.064 J B
120213520	Mercury	1.00	1.04	97	0.069 J B
120613843	Mercury	1.00	0.905	91	0.20 U

Table 2-22. Sediment Method 9012 MS/MSD Recoveries

<i>Sample ID</i>	<i>Parameter</i>	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Rec (%)</i>	<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
102813264	Cyanide	7.8	7.1	62	7.8	8	74	12	2.2 M0	20
102813277	Cyanide	2.9	2.9	96	2.9	2.9	95	1	0.18 U	20
102913309		6.2	6.6	88	6.2	6.7	90	2	1.2 JB	20
102913343	Cyanide	2.3	2.4	99	2.3	2.4	98	1	0.15 U	20
110113376	Cyanide	9.4	14.4	116	9.4	12.6	97	13	3.5	20
110113429	Cyanide	5	5.1	96	5	5.1	98	1	0.32 J	20
110413458		4.9	4.7	94	4.9	4.9	98	3	0.30 U	20
110413471	Cyanide	3.4	3.5	101	3.4	3.5	101	1	0.21 U	20
110813518	Cyanide	2.3	2.3	94	2.3	3.1	130	31	0.14 UM0, R1	20
111113038	Cyanide	4.4	4.3	95	4.4	4.4	98	3	0.28 U	20
111213045		14.4	15.3	101	14.4	14.4	95	6	0.89 U	20
111313092	Cyanide	4.1	4.2	98	4.1	4.6	108	10	0.26 U	20
111413134		9.2	11.4	82	9.2	12.7	96	10	3.9	20
111413155	Cyanide	3.5	3.6	97	3.5	3.6	98	1	0.22 U	20
111513200	Cyanide	10.5	18.9	103	10.5	14.3	59	28	8.2 M0, R1	20
111513208		4.2	9.4	37	4.2	4.5	-78	71	7.8 M0, R1	20
111813220	Cyanide	6.8	7.1	90	6.8	7.3	93	3	0.96 J	20
111813241		12.3	13.8	92	12.3	14.5	97	5	2.5	20
111813252	Cyanide	4.8	4.9	102	4.8	4.9	101	1	0.29 U	20
111913305		4.5	4.7	101	4.5	4.5	97	3	0.28 U	20
112013340	Cyanide	9.7	35.7	17	9.7	45.4	118	24	34.0 M0, R1	20
112013358		3.8	3.7	96	3.8	3.6	94	2	0.24 U	20
112213423	Cyanide	4	4.2	100	4	4.2	99	1	0.26 U	20
112213427	Cyanide	13.5	14.7	99	13.5	14.7	99	0	1.3 J	20
112513466		7.9	14.6	152	7.9	10.3	97	34	2.7 M0, R1	20
112613492	Cyanide	13.7	14.8	102	13.7	13.9	94	7	1.1 J	20
120213546	Cyanide	11.4	12.9	105	11.4	13.4	110	4	1.0 J	20
120213560	Cyanide	3.7	2.9	78	3.7	1.6	40	60	0.22 UM0, R1	20
120413619	Cyanide	8.9	10.2	79	8.9	13.3	114	27	3.1 M0, R1	20
120413635		8.6	10.6	89	8.6	9.5	77	10	2.9 M0	20
120613846	Cyanide	2.8	5.5	73	2.8	3	-14	58	3.4 M0, R1	20
120613860		3.9	4.1	98	3.9	3.9	94	4	0.32 J	20

Table 2-23. Sediment Lloyd Kahn TOC MS Recoveries

<i>Sample ID</i>	<i>Parameter</i>	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
102913343	Total Organic Carbon	35000	71660	86	41500	20
102813277	Total Organic Carbon	35000	86990	111	48300 B	20
110113376	Total Organic Carbon	35000	168600 4	78	141000 B	20
110413458	Total Organic Carbon	35000	73620 F	74	47600 B	20
111113038	Total Organic Carbon	31000	72840	105	40300	20
111313092	Total Organic Carbon	33000	84080	94	53000 B	20
111513200	Total Organic Carbon	31800	142600 H	83	116000 H B	20
111813252	Total Organic Carbon	33300	78650	107	43000 B	20
111913305	Total Organic Carbon	31500	77400	112	42000 B	20
112213427	Total Organic Carbon	32700	132300	106	97600 B ^	20
112613492	Total Organic Carbon	31300	120100 F	63	101000	20
120213560	Total Organic Carbon	31500	68340	86	41200 B ^	20
120413619	Total Organic Carbon	33700	139000 F	134	93700	20

2.7 Internal Standards

The National Functional Guidelines for Inorganic Data Review, January 2010 requires the relative intensity (%RI) for ICP/MS internal standards to fall within 60-125% for each sample analysis relative to the calibration standards. The internal standards bismuth did not meet this criterion. In the event an internal standard in a sample relative intensity is not within the 60-125% limit, the NFG direct the reviewer to qualify the data for those analytes with atomic masses that fall between the atomic mass of the internal standard lighter than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard, or between the limit (upper or lower) of the mass range and the nearest unaffected internal standard. Based upon this guidance the only analyte affected is lead. Results for lead for samples 102813282, 102813283, 102813284, 102913299, 102913300, and 102913301, will be qualified as estimated (“J”) for results greater than the MDL and (“UJ”) for non-detect results.

2.8 ICP/MS Serial Dilutions

Serial dilution tests were performed by the laboratory on an analytical batch basis.

All serial dilution tests met the acceptance criterion defined in the test method for most of the metals with the exception of 103013363 (equipment blank) for iron, and 111513159 which failed for copper and zinc. Results that are >MDL for iron in sample 103013363, and copper and zinc results in SDG 4088879 will be qualified as estimated ("J"), while non-detects are qualified as estimated ("UJ").

2.9 TOC Quadruplicate Analysis

According to the Lloyd Kahn method one in every 20 samples in a batch should be run in quadruplicate, and meet a criterion of less than three standard deviations (3SD). The lab ran what appears to be every sample in quadruplicate. All of the samples that did not meet the 3SD were rerun, or rejected by calculation through a Dixon outlier test.

2.10 Field Duplicates

Field duplicates were collected and analyzed for all of the inorganic parameters. Field duplicates generally show agreement for all of the analytes where the values are above the sample quantitation limit. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs.

Criteria for evaluating field duplicate precision is provided in the Multi-Site QAPP Addendum dated March 12, 2012. Worksheet #28 of that addendum defines an upper limit of 30% RPD for precision between field duplicate values for inorganic parameters.

For the inorganic field duplicates, multiple sample results exceeded 30% RPD above the LOQ. Based upon the RPD values, sample results for failed elements and duplicate samples will be qualified as estimated ("J").

The results of the duplicate analyses are given in Tables 2-24 through 2-28.

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	10800		455	10400		459	3.8	14600	P6	301	13800		265	5.6
Antimony	3.4		1.8	2		1.8	51.9	0.33	JD3, M0	1.2	0.30	JD3	1.1	9.5
Arsenic	9.6		1.8	7.8		1.8	20.7	11.2		1.2	11.4		1.1	1.8
Barium	368		1.8	338		1.8	8.5	41.1		1.2	42.3		1.1	2.9
Cadmium	38.9		1.8	35.6		1.8	8.9	0.19	JD3	1.2	1.1	UD3	1.1	NC
Chromium	341		1.8	296		1.8	14.1	24.4		1.2	24.5		1.1	0.4
Copper	440		1.8	346		1.8	23.9	31.3		1.2	34.1		1.1	8.6
Iron	24400		455	21100		459	14.5	25200	P6	301	25100		265	0.4
Lead	789		18.2	711		18.3	10.4	15.5		1.2	17.9		1.1	14.4
Manganese	372		1.8	303		1.8	20.4	419		1.2	407		1.1	2.9
Nickel	236		1.8	207		1.8	13.1	36.5		1.2	37.6		1.1	3.0
Selenium	2.8		1.8	3		1.8	6.9	1.6		1.2	1.9		1.1	17.1
Silver	17.9		0.91	16		0.92	11.2	0.043	JD3	0.60	0.067	JD3	0.53	43.6
Vanadium	14.1		1.8	13.3		1.8	5.8	31.3		1.2	29.8		1.1	4.9
Zinc	1360		364	1170		367	15.0	61.7		24.1	57.2		21.2	7.6

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 1

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	12100		273	12200		552	0.8	12900		426	13100		458	1.5
Antimony	0.26	JD3	1.1	4.1		2.2	176.1	3.4		1.7	3.9		1.8	13.7
Arsenic	13.2		1.1	19.7		2.2	39.5	38.6		1.7	42.5		1.8	9.6
Barium	44.8		1.1	562		2.2	170.5	482		1.7	530		1.8	9.5
Cadmium	0.32	JD3	1.1	104		2.2	198.8	5.4		1.7	2.8		1.8	63.4
Chromium	23.6		1.1	1030		2.2	191.0	496		1.7	538		1.8	8.1
Copper	36.8		1.1	636		2.2	178.1	269		1.7	269		1.8	0.0
Iron	25000		273	22900		552	8.8	25500		426	25000		458	2.0
Lead	21.1		1.1	946		2.2	191.3	681		1.7	701		1.8	2.9
Manganese	429		1.1	291		2.2	38.3	372		1.7	367		1.8	1.4
Nickel	36.7		1.1	215		2.2	141.7	39		1.7	34		1.8	13.7
Selenium	1.7		1.1	3.9		2.2	78.6	2.6		1.7	2.6		1.8	0.0
Silver	0.11	JD3	0.55	21.3		1.1	197.9	7.8		0.85	11		0.92	34.0
Vanadium	28.7		1.1	0.51	UD3	2.2	NC	14.9		1.7	13.8		1.8	7.7
Zinc	88.7		21.9	2940		44.2	188.3	1040		34.1	1020		36.7	1.9

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 2

Parameter	Sample ID: 111313084			Sample ID: 111313095			RPD	Sample ID: 111513201			Sample ID: 111513208			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	16600		496	14400		485	14.2	18500		606	8040		287	78.8
Antimony	2.6		2.0	3		1.9	14.3	3.6		2.4	1.2		1.1	100.0
Arsenic	17		2.0	16.9		1.9	0.6	14.3		2.4	6.1		1.1	80.4
Barium	423		2.0	437		1.9	3.3	479		2.4	201		1.1	81.8
Cadmium	87.3		2.0	83.1		1.9	4.9	114		2.4	43.9		1.1	88.8
Chromium	1290		2.0	1760		1.9	30.8	763		2.4	336		1.1	77.7
Copper	670		2.0	695		1.9	3.7	733		2.4	342		1.1	72.7
Iron	26600		496	26100		485	1.9	26100		606	11700		287	76.2
Lead	925		2.0	899		1.9	2.9	1420		2.4	563		1.1	86.4
Manganese	368		2.0	326		1.9	12.1	326		2.4	142		1.1	78.6
Nickel	150		2.0	198		1.9	27.6	246		2.4	108		1.1	78.0
Selenium	3.2		2.0	3.8		1.9	17.1	4		2.4	1.7		1.1	80.7
Silver	18.9		0.99	20.4		0.97	7.6	32.8		1.2	14.8		0.57	75.6
Vanadium	3.8		2.0	2.2	UD3	9.7	NC	17.7		2.4	8.3		1.1	72.3
Zinc	2610		39.6	2940		38.8	11.9	2620		48.5	1080		23.0	83.2

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 3

Parameter	Sample ID: 111813251			Sample ID: 111813258			RPD	Sample ID: 112213444			Sample ID: 112213446			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	10400		362	12300		489	16.7	13000		282	12500		250	3.9
Antimony	3.8		1.4	4.7		2.0	21.2	0.33	JD3	1.1	0.29	JD3	1.0	12.9
Arsenic	30.6		1.4	40.7		2.0	28.3	12.0		1.1	13.0		1.0	8.0
Barium	405		1.4	535		2.0	27.7	35.1		1.1	34.9		1.0	0.6
Cadmium	32.5		1.4	57.5		2.0	55.6	0.28	JD3	1.1	0.17	JD3	1.0	48.9
Chromium	491		1.4	723		2.0	38.2	23.4		1.1	22.2		1.0	5.3
Copper	350		1.4	645		2.0	59.3	35.1		1.1	35.2		1.0	0.3
Iron	19600		362	24400		489	21.8	24200		282	24300		250	0.4
Lead	545		2.9	843		2.0	42.9	18.3		1.1	18.3		1.0	0.0
Manganese	227		1.4	275		2.0	19.1	460		1.1	454		1.0	1.3
Nickel	65.3		1.4	104		2.0	45.7	37.6		1.1	35.9		1.0	4.6
Selenium	2.8		1.4	4.3		2.0	42.3	2.1		1.1	2.0		1.0	4.9
Silver	7.3		0.72	13.3		0.98	58.3	0.076	JD3	0.56	0.056	JD3	0.50	30.3
Vanadium	11.5		1.4	13.4		2.0	15.3	29.5		1.1	27.8		1.0	5.9
Zinc	1470		29.0	2270		39.1	42.8	71.3		22.6	54.8		20.0	26.2

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 4

Parameter	Sample ID: 112613504			Sample ID: 112613517			RPD	Sample ID: 120213557			Sample ID: 120213570			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	15500		495	15500		503	0.0	15800		437	16200		517	2.5
Antimony	2.6		2.0	3.0		2.0	14.3	4.9		1.7	3.3		2.1	39.0
Arsenic	17.0		2.0	17.4		2.0	2.3	31.4		1.7	17.5		2.1	56.9
Barium	382		2.0	413		2.0	7.8	532		1.7	424		2.1	22.6
Cadmium	68.0		2.0	68.9		2.0	1.3	87.0		1.7	75.8		2.1	13.8
Chromium	803		2.0	866		2.0	7.5	927		1.7	799		2.1	14.8
Copper	479		2.0	501		2.0	4.5	571		1.7	504		2.1	12.5
Iron	25800		495	26600		503	3.1	29300		437	27800		517	5.3
Lead	809		2.0	803		4.0	0.7	904		1.7	887		2.1	1.9
Manganese	293		2.0	315		2.0	7.2	307		1.7	303		2.1	1.3
Nickel	161		2.0	146		2.0	9.8	149		1.7	173		2.1	14.9
Selenium	3.5		2.0	3.0		2.0	15.4	4.2		1.7	3.8		2.1	10.0
Silver	17.2		0.99	17.7		1.0	2.9	15.0		0.87	18.3		1.0	19.8
Vanadium	14.3		2.0	9.3		2.0	42.4	29.5		1.7	28.7		2.1	2.7
Zinc	2140		39.6	2130		40.2	0.5	2470		35.0	2260		41.4	8.9

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 5

Parameter	Sample ID: 111113038			Sample ID: 111113041			RPD	Sample ID: 111913305			Sample ID: 111913307			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	14700	P6	312	14700		289	0.0	19400	P6	384	17900		306	8.0
Antimony	0.29	JD3, M0	1.2	0.38	JD3	1.2	26.9	0.44	JD3, M0	1.5	0.12	JD3	1.2	114.3
Arsenic	12.1		1.2	12.9		1.2	6.4	11.5		1.5	11.1		1.2	3.5
Barium	52		1.2	62.6		1.2	18.5	75.3		1.5	74.8		1.2	0.7
Cadmium	0.16	UD3	1.2	1.6		1.2	163.6	0.23	JD3	1.5	1.5		1.2	146.8
Chromium	24.3		1.2	33.3		1.2	31.3	34.2		1.5	43		1.2	22.8
Copper	33.4		1.2	44.1		1.2	27.6	36.7		1.5	41.6		1.2	12.5
Iron	26800	P6	312	29600		289	9.9	29900	P6	384	27500		306	8.4
Lead	17.9		1.2	34		1.2	62.0	18.5		1.5	41.6		1.2	76.9
Manganese	499	P6	1.2	333		1.2	39.9	513		1.5	454		1.2	12.2
Nickel	36		1.2	43.4		1.2	18.6	45.8		1.5	42.3		1.2	7.9
Selenium	2.4		1.2	2.3		1.2	4.3	2.9		1.5	2.1		1.2	32.0
Silver	0.034	JD3	0.62	0.36	JD3	0.58	165.5	0.12	JD3	0.77	0.24	JD3	0.61	66.7
Vanadium	32.6		1.2	33.5		1.2	2.7	41.6		1.5	38.2		1.2	8.5
Zinc	59.9	M0	24.9	92.5		23.1	42.8	72.2		30.7	92.4		24.5	24.5

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 6

Parameter	Sample ID: 112013358			Sample ID: 112013364			RPD	Sample ID: 120413619			Sample ID: 120413632			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	15900	P6	317	15500		280	2.5	18000	P6	633	18700		551	3.8
Antimony	0.73	JD3, M0	1.3	0.19	JD3	1.1	117.4	2.6	M0	2.5	2.0	JD3	2.2	26.1
Arsenic	10.3		1.3	9.7		1.1	6.0	10		2.5	10.3		2.2	3.0
Barium	58.5		1.3	55.1		1.1	6.0	358		2.5	377		2.2	5.2
Cadmium	0.56	JD3	1.3	0.21	JD3	1.1	90.9	47.0		2.5	48.7		2.2	3.6
Chromium	31.7		1.3	27.2		1.1	15.3	307		2.5	345		2.2	11.7
Copper	30.8		1.3	32.4		1.1	5.1	435		2.5	462		2.2	6.0
Iron	25400	P6	317	24700		280	2.8	25600	P6	633	26400		551	3.1
Lead	16.2		1.3	17.5		1.1	7.7	431	M0	2.5	478		2.2	10.3
Manganese	413		1.3	408		1.1	1.2	329		2.5	341		2.2	3.6
Nickel	38.5		1.3	37.7		1.1	2.1	144		2.5	154		2.2	6.7
Selenium	2.7		1.3	2.4		1.1	11.8	3.3		2.5	3.0		2.2	9.5
Silver	0.31	JD3	0.63	0.045	JD3	0.56	149.3	26.4		1.3	25.5		1.1	3.5
Vanadium	35.6		1.3	33.4		1.1	6.4	24.9		2.5	31.5		2.2	23.4
Zinc	61.4	M0	25.3	87.0		22.4	34.5	1490		50.6	1540		44.1	3.3

Table 2-25. Sediment Method 7471 Field Duplicates Results Summary

Analyte	Sample ID	Dup Sample ID	Result (mg/kg)	Lab Flag	LOQ	RPD
Mercury	FD102813265	102813265	3.2		0.25	
		102813281	2.2		0.21	37.0
	FD102913343	102913343	0.23	M0	0.0080	
		102913348	0.07		0.0063	106.7
	FD110113380	110113390	0.084		0.0073	
		110113392	5.2		0.24	193.6
	FD110413457	110413457	5.5		0.20	
		110413460	6.1		0.20	10.3
	FD111313084	111313084	2.8		0.23	
		111313095	2.6		0.27	7.4
	FD111513201	111513201	2.9		0.27	
		111513208	1.1		0.14	90.0
	FD111813251	111813251	9.4		0.20	
		111813258	12.7		2.1	29.9
	FD112213444	112213444	0.031		0.0070	
		112213446	0.040		0.0065	25.4
	FD112613504	112613504	3.0		0.20	
		112613517	3.6		0.23	18.2

Analyte	Sample ID	Dup Sample ID	Result (mg/kg)	Lab Flag	LOQ	RPD
	FD120213557	120213557	7.0		0.25	
		120213570	3.9		0.21	56.9
	MFD111113038	111113038	0.021		0.0083	
		111113041	0.024		0.0068	13.3
	MFD111913305	111913305	0.024		0.010	
		111913307	0.021		0.0079	13.3
	MFD112013358	112013358	0.020		0.0085	
		112013364	0.022		0.0065	9.5
	MFD120413619	120413619	1.8	P6	0.33	
		120413632	2.7		0.34	40.0

Table 2-26. Sediment 9012 Field Duplicates Results Summary

Analyte	Sample ID	Dup Sample ID	Result (mg/kg)	Lab Flag	LOQ	RPD
Cyanide	FD102813265	102813265	2.9	B	1.2	
		102813281	1.8	B	1.6	46.8
	FD102913343	102913343	0.47	U	0.47	
		102913348	0.72	U	0.72	0.0
	FD110113380	110113390	0.49	U	0.49	
		110113392	4.9		1.1	NC
	FD110413457	110413457	0.82	J	1.2	
		110413460	1.0	J	1.3	19.8
	FD111313084	111313084	4.1		1.7	
		111313095	2.5	J	2.5	48.5
	FD111513201	111513201	20.7		1.9	
		111513208	7.8	M0, R1	0.85	90.5
	FD111813251	111813251	1.9		1.3	
		111813258	3.5		1.8	59.3
	FD112213444	112213444	0.40	U	0.40	
		112213446	0.93	U	0.93	0.0
	FD112613504	112613504	4.5		1.3	
		112613517	4.0		1.7	11.8
	FD120213557	120213557	4.4		1.6	
		120213570	2.8		1.7	44.4
	MFD111113038	111113038	0.28	U	0.88	
		111113041	0.37	J	1.0	27.7
	MFD111913305	111913305	0.28	U	0.88	
		111913307	0.41	U	1.3	37.7
	MFD112013358	112013358	0.24	U	0.76	
		112013364	0.27	U	0.85	11.8
	MFD120413619	120413619	3.1	M0, R1	1.8	
		120413632	2.6		2.2	17.5

Table 2-27. Sediment Lloyd Kahn TOC Field Duplicates Results Summary

Analyte	Sample ID	Dup Sample ID	Result (mg/kg)	Lab Flag	LOQ	RPD
Total Organic Carbon	FD102813265	102813265	143000	B	1000	
		102813281	104000		1000	31.6
	FD102913343	102913343	41500		1000	
		102913348	41700		1000	0.5
	FD110113380	110113390	46300	B	1000	
		110113392	138000	B	1000	99.5
	FD110413457	110413457	97900	B ^	1000	
		110413460	113000	B	1000	14.3
	FD111313084	111313084	123000	B	1000	
		111313095	121000	B	1000	1.6
	FD111513201	111513201	123000	H B	1000	
		111513208	123000	H B	1000	0.0
	FD111813251	111813251	115000	B	1000	
		111813258	85200	B	1000	29.8
	FD112213444	112213444	48200	B	1000	
		112213446	46700	B	1000	3.2
	FD112613504	112613504	134000		1000	
		112613517	116000		1000	14.4
	FD120213557	120213557	123000	B ^	1000	
		120213570	130000	B	1000	5.5
	MFD111113038	111113038	40300		1000	
		111113041	45700		1000	12.6
	MFD111913305	111913305	42000	B	1000	
		111913307	38700	B	1000	8.2
	MFD112013358	112013358	41300	B	1000	
		112013364	40900	B	1000	1.0
	MFD120413619	120413619	93700		1000	
		120413632	94300		1000	0.6

Table 2-28. Percent Moisture Field Duplicates Results Summary TestAmerica

Analyte	Sample ID	Dup Sample ID	Result	Lab Flag	LOQ	RPD
Percent Moisture	FD102813265	102813265	53.9		0.10	
		102813281	49.4		0.10	8.7
	FD102913343	102913343	17.4		0.10	
		102913348	16.7		0.10	4.1
	FD110113380	110113390	15.2		0.10	
		110113392	56.1		0.10	114.7
	FD110413457	110413457	47.3		0.10	
		110413460	47.9		0.10	1.3
	FD111313084	111313084	51.9		0.10	
		111313095	52		0.10	0.2
	FD111513201	111513201	61		0.10	
		111513208	21.5		0.10	95.8
	FD111813251	111813251	39.1		0.10	
		111813258	49.8		0.10	24.1
	FD112213444	112213444	14.0		0.10	
		112213446	13.9		0.10	0.7
	FD112613504	112613504	50.1		0.10	
		112613517	50.4		0.10	0.6
	FD120213557	120213557	51.6		0.10	
		120213570	52.2		0.10	1.2
	MFD111113038	111113038	19.8		0.10	
		111113041	20.2		0.10	2.0
	MFD111913305	111913305	35.2		0.10	
		111913307	30.4		0.10	14.6
	MFD112013358	112013358	21.2		0.10	
		112013364	21.4		0.10	0.9
	MFD120413619	120413619	60.6		0.10	
		120413632	60.7		0.10	0.2

Table 2-28. Percent Solid Field Duplicates Results PACE

Analyte	Sample ID	Dup Sample ID	Result	Lab Flag	LOQ	RPD
Percent Solids	FD102813265	102813265	47.4		0.25	
		102813281	49.3		0.25	3.9
	FD102913343	102913343	82.4		0.25	
		102913348	83.5		0.25	1.3
	FD110113380	110113390	86.4		0.25	
		110113392	45.1		0.25	62.8
	FD110413457	110413457	51.1		0.25	
		110413460	52.4		0.25	2.5
	FD111313084	111313084	47.8		0.25	
		111313095	52.7		0.25	9.8
	FD111513201	111513201	38.4		0.25	
		111513208	38.3		0.25	0.3
	FD111813251	111813251	56.8		0.25	
		111813258	49.6		0.25	13.5
	FD112213444	112213444	86.5		0.25	
		112213446	86.9		0.25	0.5
	FD112613504	112613504	50.3		0.25	
		112613517	50.2		0.25	0.2
	FD120213557	120213557	48.8		0.25	
		120213570	48.1		0.25	1.4
	MFD111113038	111113038	80.3		0.25	
		111113041	80.5		0.25	0.2
	MFD111913305	111913305	79.8		0.25	
		111913307	77.8		0.25	2.5
	MFD112013358	112013358	79.4		0.25	
		112013364	79.7		0.25	0.4
	MFD120413619	120413619	40.1		0.25	
		120413632	39.4		0.25	1.8

3.0 ORGANIC DATA REVIEW

Blank, spiked, and duplicate results were provided. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples. Ottawa sand was used as the matrix for VOC method blank analysis for sediment samples and organic free water was used as the method blank for water samples. Sodium sulfate was used as the matrix for method blanks for the semivolatile organics (PNAs, PCBs, Phenols, and SVOCs) analyses for the sediment samples and organic free water was used as the method blank for water samples.

Sediment samples were analyzed for organic compounds following SW-846 Methods or laboratory developed methods as shown in Table 3-1.

Table 3-1. Organic Analytes and Methods Summary

Analytical Method	Analyte
EPA 8260B	Purgeable Volatile Organic Compounds (PVOC)
EPA 8270C	Semivolatile Organic Compounds (SVOC)
EPA 8270C-SIM	Polycyclic Aromatic Hydrocarbons (PAHs)
EPA 8082	PCBs
Alkylated PAH by SIM	Alkylated PAHs

3.1 SW-846 Method 8260B – Purgeable Volatile Organic Compounds

3.1.1 Summary

SW-846 Method 8260B employs gas chromatographic separation with a mass spectrometer as a detector.

Sample 110113376MS was received with the vial septa reversed which prevented an airtight seal. Therefore, results for this sample will be qualified as estimated (“J”) or (“UJ”).

3.1.2 Method Blanks

The sediment samples were analyzed in 24 analytical batches for sediments. The aqueous samples (trip blanks) were analyzed in 11 analytical batches. One sediment sample batch had benzene and toluene detected above the reporting limit, in addition ethylbenzene, xylenes (total) and 1,2,4-trimethylbenzene were detected between the MDL and reporting limit. All associated samples in which these analytes are detected above the MDL and below five times the blank value will be qualified as estimated (“J”). Sample results greater than five times the blank value or non-detect will not be qualified.

The method blank data are summarized in Tables 3-2 and 3-3.

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 145790	QC Batch: 145943	QC Batch: 146030	QC Batch: 146371	QC Batch: 146516	QC Batch: 146521	QC Batch: 146524	QC Batch: 147224	QC Batch: 147429
1,2,4-Trimethylbenzene	9.5 U	10.2 J	9.5 U						
1,3,5-Trimethylbenzene	13.4 U								
Benzene	7.3 U	22.2	7.3 U						
Ethylbenzene	8.9 U	14.1 J	8.9 U						
Toluene	15.5 U	121	15.5 U						
Xylene (Total)	39.2 U	59.1 J	39.2 U						

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg) Cont 1

Parameter	QC Batch: 147482	QC Batch: 147662	QC Batch: 147989	QC Batch: 147996	QC Batch: 148138	QC Batch: 148255	QC Batch: 148418	QC Batch: 148593	QC Batch: 148883
1,2,4-Trimethylbenzene	9.5 U								
1,3,5-Trimethylbenzene	13.4 U								
Benzene	7.3 U								
Ethylbenzene	8.9 U								
Toluene	15.5 U								
Xylene (Total)	39.2 U								

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg) Cont 2

Parameter	QC Batch: 148945	QC Batch: 149038	QC Batch: 149245	QC Batch: 149392	QC Batch: 149523	QC Batch: 149829
1,2,4-Trimethylbenzene	9.5 U					
1,3,5-Trimethylbenzene	13.4 U					
Benzene	7.3 U					
Ethylbenzene	8.9 U					
Toluene	15.5 U					
Xylene (Total)	39.2 U					

Table 3-3. Water Method 8260 Method Blank Results Summary (µg/L)

Parameter	QC Batch: 200- 63941	QC Batch: 200- 64060	QC Batch: 200- 64525	QC Batch: 200- 64717	QC Batch: 200- 65166	QC Batch: 200- 65230
1,2,4-Trimethylbenzene	0.20 U					
1,3,5-Trimethylbenzene	0.18 U					
Benzene	0.17 U					
Ethylbenzene	0.18 U					
m&p-Xylene	0.36 U					
o-Xylene	0.17 U					
Toluene	0.17 U					
Xylenes, Total	0.17 U					

Table 3-3. Water Method 8260 Method Blank Results Summary (µg/L) Cont

Parameter	QC Batch: 200- 65297	QC Batch: 200- 65502	QC Batch: 200- 65582	QC Batch: 200- 65782	QC Batch: 200- 66095
1,2,4-Trimethylbenzene	0.20 U				
1,3,5-Trimethylbenzene	0.18 U				
Benzene	0.17 U				
Ethylbenzene	0.18 U				
m&p-Xylene	0.36 U				
o-Xylene	0.17 U				
Toluene	0.17 U				
Xylenes, Total	0.17 U				

3.1.3 Trip Blanks, Field Blanks, Equipment Blanks

Twelve trip blanks were provided with this sample set. None of the trip blanks associated with these samples gave results above the detection limit.

Twenty three equipment blanks were also collected and submitted for analysis. None of the equipment blanks associated with these samples gave results above the detection limit. No data for Method 8260 will be qualified based on trip blanks or equipment blanks.

3.1.4 Calibration

All initial calibration criteria were met for all compounds. All analytes fit first order linear regression curves and gave average response factors (RFs) with <15% RSD over the average. Therefore average RFs were used in sample quantitation. No data are qualified as a result of the initial calibration data.

For evaluating calibration verifications, the June 2008 CLP National Functional Guidelines have established a $\pm 40\%$ drift or difference acceptability criterion for analytes known to exhibit poor response and a $\pm 25\%$ drift or difference criterion for all other target analytes. None of the analytes of concern in this investigation are considered to exhibit poor response. The calibration verification associated with this data set did not exceed the $\pm 25\%$ difference criterion in place for all other target analytes. Consequently, no data are qualified as a result of the calibration verification data.

3.1.5 Surrogate Compound Recoveries

For analyses performed by Pace, three surrogate compounds, 4-bromofluorobenzene, toluene- d_8 , and dibromofluoromethane were spiked into each sediment field sample to monitor analyte recovery in the analytical system. For aqueous sample analyses performed by TestAmerica, four surrogate compounds, 1,2-dichlorobenzene- d_4 , 1,2-dichloroethane- d_4 , bromofluorobenzene, and toluene- d_8 were spiked into each aqueous field sample to monitor analyte recovery in the analytical system. The surrogates used by each laboratory are acceptable to measure recovery under EPA SW-846 guidance for this analytical method.

In some cases surrogate compound recoveries are not within specified recovery range due to sample dilution as a consequence of high analyte concentrations or high amounts of non-target analytes present in the samples. In these cases, the laboratory appended their qualifier to indicate dilution as the cause for the low recovery. Sample dilution, when warranted, is not cause to further qualify sample results.

Many other sediment samples gave recoveries below limits used by the laboratory. In these cases the failed recovery is not associated with a sample dilution. For these samples with dilutions less than 5x, positive results are qualified as estimated ("J"), and non-detects as ("UJ")

Recoveries for all surrogates for all samples are presented in Tables 3-4 and 3-5.

Table 3-4. Sediment Method 8260 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene- <i>d</i> ₈	
			Limits:	49	130	57	130	54
4087646001	102813264	1	57		66		61	
4087646002	102813265	1	59		69		64	
4087646003	102813266	1	51		66		58	
4087646004	102813273	1	50		64		58	
4087646005	102813277	1	79		96		85	
4087646006	102813281	1	54		64		59	
4087646007	102813282	1	54		69		62	
4087646008	102813283	1	50		64		57	
4087646009	102813284	1	57		68		62	
4087646010	102813287	4	84		78	D3	87	
4087646011	102813288	1	65		73		67	
4087646012	102913291	1	55		62		58	
4087646013	102913292	1	54		62		58	
4087646014	102913293	1	63		66		64	
4087646015	102913299	2.5	68		67	D3	70	
4087646016	102913300	8	65		63	D3	67	
4087646017	102913301	2.5	61		59	D3	60	
4087646018	102913306	2	69		73	D3	72	
4087646019	102913308	1	53		58		54	
4087646020	102913309	1	54		57		52	1q
4087646021	102913310	1	49		48	S1	44	S1
4087646022	102913313	1	52		54	1q	50	1q
4087646023	102913317	20	0	S4	0	D3, S4	0	S4
4087646024	102913325	2	68		79		76	
4087646025	102913327	1	47	1q	59		52	1q
4087646026	102913328	1	35	1q	52	1q	41	1q
4087646027	102913329	1	50		62		56	
4087646028	102913338	1	45	1q	59		50	1q
4087646029	102913343	4	76		84	D3	80	
4087646030	102913348	4	68		76	D3	75	
4087646031	102913349	1	66		80		72	
4087646032	102913350	1	56		71		59	
4087646033	102913351	1	53		66		59	
4087646034	102913355	20	0	S4	0	D3, S4	0	S4
4087646035	102913361	20	0	S4	0	D3, S4	0	S4
4088053001	110113375	1	39	S1	56	S1	49	S1

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene- d_8	
4088053002	110113376	1	36	S1	44	S1	36	S1
4088053003	110113377	1	36	S1	50	S1	43	S1
4088053004	110113380	1	48	S1	61		51	S1
4088053005	110113386	10	56		63	D3	59	
4088053006	110113389	5	53		58	D3	54	
4088053007	110113390	1	85		88		91	
4088053008	110113392	1	47	S1	60		52	S1
4088053009	110113393	1	60		67		67	
4088053010	110113394	1	63		71		65	
4088053011	110113395	1	68		71		61	
4088053012	110113399	2	61		68	D3	63	
4088053013	110113406	10	77		89	D3	84	
4088053014	110113408	1	85		88		87	
4088053015	110113410	1	63		70		68	
4088053016	110113411	1	57		67		61	
4088053017	110113412	1	57		67		62	
4088053018	110113424	1	67		74		69	
4088053019	110113429	1	67		69		70	
4088053020	110413432	1	61		61		64	
4088053021	110413433	1	57		60		61	
4088053022	110413434	1	56		63		60	
4088053023	110413441	80	0	S4	0	D3, S4	0	S4
4088053024	110413443	2.5	95		90		99	
4088053025	110413448	1	43	S1	58		49	S1
4088053026	110413449	1	60		67		64	
4088053027	110413450	1	57		67		64	
4088053028	110413457	80	0	S4	0	D3, S4	0	S4
4088053029	110413458	2.5	91		90		97	
4088053030	110413460	4	77		66		74	
4088053031	110413461	1	59		59		58	
4088053032	110413462	1	55		63		60	
4088053033	110413463	1	48	S0	58		54	
4088053034	110413466	1	56		65		61	
4088053035	110413470	80	0	S4	0	D3, S4	0	S4
4088053036	110413471	1	98		95		100	
4088482001	110813001	1	50		55	4q	49	4q
4088482002	110813002	1	48	S1	55	S1	48	S1
4088482003	110813003	1	49		55	4q	48	4q
4088482004	110813017	2	52		60	D3	52	4q

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene-d ₈	
4088482005	110813019	2	59		63	D3	56	
4088482006	110813020	1	81		80		78	
4088482008	111113024	1	49		52	4q	48	4q
4088482009	111113025	1	52		59		53	4q
4088482010	111113026	1	47	4q	52	4q	48	4q
4088482011	111113030	1	52		55	4q	49	4q
4088482012	111113034	1	63		66		60	
4088482013	111113038	1	80		84		80	
4088482014	111113041	1	78		86		81	
4088482015	111213043	1	51		62		57	
4088482016	111213044	1	48	4q	58		54	
4088482017	111213045	1	48	4q	59		53	4q
4088482018	111213062	1	56		67		58	
4088482019	111213063	1	79		89		83	
4088482020	111213064	1	79		85		82	
4088486001	110813504	1	62		69		63	
4088486002	110813505	1	61		67		62	
4088486003	110813506	1	59		68		60	
4088486004	110813510	1	64		70		63	
4088486005	110813515	40	0	S4	0	D3, S4	0	S4
4088486006	110813517	1	82		90		82	
4088486007	110813518	1	82		87		80	
4088622001	111313070	1	44	1q	52	1q	46	1q
4088622002	111313071	1	45	2q	57		50	2q
4088622003	111313072	1	50		61		53	2q
4088622004	111313084	1	74		80		73	
4088622005	111313085	10	67		78	D3	69	
4088622006	111313087	1	73		80		73	
4088622007	111313092	1	83		92		84	
4088622008	111313095	1	81		85		80	
4088622009	111313096	1	47	2q	57		51	2q
4088622010	111313097	1	50		63		53	2q
4088622011	111313098	1	47	2q	59		51	2q
4088622012	111313110	1	63		71		64	
4088622013	111313114	1	83		90		83	
4088622014	111413118	1	53		67		58	
4088622015	111413119	1	56		65		59	
4088622016	111413120	1	53		61		54	
4088622017	111413134	1	54		65		55	

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene-d ₈	
4088622018	111413137	1	79		87		78	
4088622019	111413139	1	55		64		58	
4088622020	111413140	1	47	2q	56	2q	49	2q
4088622021	111413141	1	59		69		61	
4088622022	111413153	2	55		63	D3	56	
4088622023	111413154	5	68		71	D3	67	
4088622024	111413155	1	77		87		76	
4088879001	111513159	1	40	5q	50	5q	44	5q
4088879002	111513160	1	45	5q	54	5q	46	5q
4088879003	111513161	1	43	5q	56	5q	45	5q
4088879004	111513178	1	46	5q	55	5q	47	5q
4088879005	111513179	1	65		71		63	
4088879006	111513182	1	47	5q	58		48	5q
4088879007	111513183	1	39	S1	49	S1	41	S1
4088879008	111513184	2	39	5q	51	5q, D3	41	5q
4088879009	111513187	25	0	S4	0	D3, S4	0	S4
4088879010	111513192	125	0	S4	0	D3, S4	0	S4
4088879011	111513193	10	75		67	D3	69	
4088879012	111513194	1	112		119		108	
4088879013	111513199	1	40	3q	43	4q	41	3q
4088879014	111513200	1	49		58		50	5q
4088879015	111513201	1	42	6q	46	6q	41	6q
4088879016	111813210	1	45	6q	46	6q	45	7q
4088879017	111813211	1	43	6q	47	6q	43	6q
4088879018	111813212	1	45	6q	48	6q	46	6q
4088879019	111813220	4	78		65	D3	69	
4088879020	111813221	1	73		71		72	
4088879021	111813223	1	82		69		74	
4088879022	111813224	1	46	6q	49	6q	44	6q
4088879023	111813225	1	47	6q	50	6q	47	6q
4088879024	111813235	10	55		57	D3	50	6q
4088879025	111813236	10	48	6q	50	6q	46	6q
4088879026	111813237	1	69		72		71	
4088879027	111813239	1	44	6q	47	6q	44	6q
4088879028	111813240	1	44	6q	49	6q	46	6q
4088879029	111813241	1	50		56	6q	51	6q
4088879030	111813251	20	0	S4	0	D3, S4	0	S4
4088879031	111813252	1	56		61		55	
4088879032	111813258	20	0	S4	0	D3, S4	0	S4

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene- d_8	
4088879033	111913260	1	55		60		60	
4088879034	111913261	1	52		57		56	
4088879035	111913262	1	53		57		56	
4088879036	111913274	5	56		58	D3	54	
4088879037	111913276	1	81		83		82	
4088879038	111913279	1	50		55	8q	52	8q
4088879039	111913280	1	49		55	8q	51	8q
4088879040	111913281	1	52		59		54	
4088879041	111913292	10	53		59	D3	53	8q
4088879042	111913293	1	75		75		75	
4088879043	111913298	1	70		70		71	
4088879044	111913299	1	75		74		76	
4088879045	111913300	1	76		74		75	
4088879046	111913305	1	81		85		83	
4088879047	111913307	1	75		77		77	
4088879048	111513208	1	49		53	2q	49	2q
4089023001	112013310	1	49		50	5q	50	5q
4089023002	112013311	1	48	4q	53	4q	52	4q
4089023003	112013312	1	47	5q	53	5q	52	5q
4089023004	112013318	1	57		59		55	
4089023005	112013327	8	57		63	D3	54	
4089023006	112013328	5	80		85	D3	83	
4089023007	112013331	1	45	S1	48	S1	47	S1
4089023008	112013332	1	54		57		53	6q
4089023009	112013333	1	51		59		56	
4089023010	112013340	1	41	6q	51	6q	43	6q
4089023011	112013343	50	0	S4	0	D3, S4	0	S4
4089023012	112013344	1	79		79		81	
4089023013	112013346	1	84		79		83	
4089023014	112013347	1	84		81		85	
4089023015	112013348	1	71		71		70	
4089023016	112013358	1	81		80	3q	82	
4089023017	112013364	20	0	S4	0	D3, S4	0	S4
4089023018	112113366	1	51		57		53	6q
4089023019	112113367	1	55		62		57	
4089023020	112113368	1	55		61		58	
4089023021	112113371	1	66		67		66	
4089023022	112113382	25	0	S4	0	D3, S4	0	S4
4089023023	112113383	1	76		78		77	

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene- <i>d</i> ₈	
4089023024	112113385	1	63		63		63	
4089023025	112113386	1	53		59		57	
4089023026	112113387	1	48	7q	57		54	
4089023027	112113389	1	46	S1	57		50	S1
4089023028	112113399	1	55		66		56	
4089023029	112113400	1	87		92		85	
4089202001	112213406	1	54		53	1q	52	1q
4089202002	112213407	1	54		57		54	
4089202003	112213408	1	58		56	1q	58	
4089202004	112213422	20	0	S4	0	D3, S4	0	S4
4089202005	112213423	1	90		80		83	
4089202006	112213424	1	92		82		86	
4089202007	112213425	1	55		54	S1	54	
4089202008	112213426	1	50		52	1q	51	1q
4089202009	112213427	1	61		60		58	
4089202010	112213443	1	64		60		56	
4089202011	112213444	1	90		79		83	
4089202012	112213446	1	90		79		80	
4089202013	112213447	1	56		65		63	
4089202014	112213448	1	53		64		59	
4089202015	112213449	1	53		64		58	
4089202016	112213450	1	57		65		60	
4089202017	112513452	1	50		60		56	
4089202018	112513453	1	53		61		58	
4089202019	112513454	1	57		65		60	
4089202020	112513466	25	0	S4	0	D3, S4	0	S4
4089202021	112513467	25	0	S4	0	D3, S4	0	S4
4089202022	112513468	1	81		86		83	
4089202023	112513469	1	82		85		83	
4089202024	112513473	1	54		60		57	
4089202025	112513474	1	57		66		59	
4089202026	112513475	1	53		59		56	
4089202027	112513485	1	63		69		64	
4089202028	112513486	1	81		83		83	
4089362001	112613490	1	46	S1	51	S1	49	S1
4089362002	112613491	1	48	3q	52	3q	49	3q
4089362003	112613492	1	52		55	3q	52	3q
4089362004	112613503	1	60		63		58	
4089362005	112613504	40	0	S4	0	D3, S4	0	S4

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene-d ₈	
4089362006	112613505	25	0	S4	0	D3, S4	0	S4
4089362007	112613506	1	75		76		77	
4089362008	112613517	40	0	S4	0	D3, S4	0	S4
4089509001	120213522	1	48	4q	56	4q	52	4q
4089509002	120213523	1	46	S1	55	S1	51	S1
4089509003	120213524	1	51		58		54	
4089509004	120213532	1	58		63		57	
4089509005	120213535	8	71		78	D3	75	
4089509006	120213545	1	49		55	3q	53	3q
4089509007	120213546	1	49		55	3q	52	3q
4089509008	120213547	1	48	3q	55	3q	52	3q
4089509009	120213557	40	0	S4	0	D3, S4	0	S4
4089509010	120213558	40	0	S4	0	D3, S4	0	S4
4089509011	120213559	40	0	S4	0	D3, S4	0	S4
4089509012	120213560	1	81		82		83	
4089509013	120213570	50	0	S4	0	D3, S4	0	S4
4089509014	120313572	1	48	3q	56	3q	53	3q
4089509015	120313573	1	52		58		56	
4089509016	120313574	1	57		63		60	
4089509017	120313581	10	60		64	D3	62	
4089509018	120313582	4	75		79	D3	74	
4089509019	120313588	1	48	S1	55	S1	50	S1
4089509020	120313589	1	52		59		53	3q
4089509021	120313590	1	52		57		53	3q
4089509022	120313602	50	0	S4	0	D3, S4	0	S4
4089509023	120313603	20	0	S4	0	D3, S4	0	S4
4089509024	120313604	1	77		81		79	
4089665001	120413617	1	47	1q	54	1q	53	1q
4089665002	120413618	1	51		58		57	
4089665003	120413619	1	56		61		57	
4089665004	120413629	10	63		69	D3	60	
4089665005	120413630	1	75		77		77	
4089665006	120413632	1	52		57		54	
4089665007	120413633	1	56		57		56	
4089665008	120413634	5	69		68	D3	66	
4089665009	120413635	1	60		64		61	
4089665010	120413641	1	75		73		73	
4089665011	120413642	1	77		75		78	
4089665012	120413645	1	78		75		78	

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene- d_8	
4089665013	120413646	1	82		80		81	
4089665014	120413653	10	59		66	D3	60	
4089665015	120413654	1	83		81		85	
4089818001	120613845	1	55		58		53	1q
4089818002	120613846	1	73		75		71	
4089818003	120613847	1	74		72		71	
4089818004	120613851	1	60		62		57	
4089818005	120613859	4	55		60	D3	54	
4089818006	120613860	1	78		79		77	

Table 3-5. Water Method 8260 Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	1,2-Dichloro-benzene- d_4		1,2-Dichloro-ethane- d_4		Bromo-fluorobenzene		Toluene- d_8	
			Limits:	75	120	80	120	80	125	80
200-19227-36	102813262	1	101		96		101		95	
200-19227-37	102813263	1	98		95		98		95	
200-19227-38	102913290	1	100		97		101		95	
200-19267-1	103013363	1	98		95		99		95	
200-19267-2	103013364	1	98		96		99		95	
200-19364-1	110113373	1	99		95		100		94	
200-19364-2	110113374	1	97		95		99		95	
200-19364-3	110413431	1	100		97		100		94	
200-19364-4	110513474	1	96		96		97		95	
200-19434-1	110713490	1	103		97		105		98	
200-19434-2	110713491	1	102		95		105		98	
200-19557-1	110813502	1	106		100		113		101	
200-19557-2	110813503	1	96		93		102		93	
200-19557-3	111113023	1	101		97		106		96	
200-19557-4	111213042	1	98		94		105		95	
200-19664-1	111513157	1	103		100		108		97	
200-19664-2	111513158	1	103		98		107		99	
200-19664-3	111813209	1	103		96		107		96	
200-19664-4	111913259	1	103		98		107		98	
200-19709-1	112013308	1	105		101		112		100	
200-19709-2	112013309	1	104		99		111		100	
200-19709-3	112113365	1	105		100		113		100	

Lab Sample Number	Field ID	Dilution	1,2-Dichlorobenzene- <i>d</i> ₄	1,2-Dichloroethane- <i>d</i> ₄	Bromo-fluorobenzene	Toluene- <i>d</i> ₈
200-19777-1	112213404	1	107	100	113	98
200-19777-2	112213405	1	105	100	111	101
200-19777-3	112513451	1	104	97	109	96
200-19822-10	120213519	1	104	99	111	100
200-19822-9	120213518	1	108	102	114	101
200-19876-1	120213520	1	102	99	108	97
200-19876-2	120213521	1	103	98	109	97
200-19876-3	120313571	1	105	101	111	98
200-19939-1	120413615	1	104	98	109	97
200-19939-2	120413616	1	105	98	110	97
200-19939-3	120513657	1	106	100	113	100
200-20035-1	120613843	1	97	95	109	96
200-20035-2	120613844	1	103	98	113	99

3.1.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed for multiple samples as specified by the project team in accordance with the Sampling and Analysis Plan. The spike solution used by the laboratory does not contain 1,2,4-trimethylbenzene or 1,3,5-trimethylbenzene. Therefore there are no spike results for the LCS or MS/MSD for these analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The MS/MSD results are summarized in Table 3-6.

Table 3-6. Sediment Method 8260 MS/MSD Recoveries

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
102813277	Benzene	2920	2280	78	2920	2250	77	1	12.4 JB	20
	Ethylbenzene	2920	2330	78	2920	2820	95	19	53.9 JB	20
	Toluene	2920	2330	79	2920	2290	78	2	18.2 U	20
	Xylene (Total)	8770	6820	77	8770	7110	80	4	66.5 JB	20
110113376	Benzene	5880	3320	56	5880	2770	47	18	17.1 U	20
	Ethylbenzene	5880	2190	37	5880	2440	41	11	27.4 J	20
	Toluene	5880	2670	43	5880	2610	42	2	143	20
	Xylene (Total)	17600	6370	35	17600	7020	39	10	137 J	20
110413458	Benzene	2840	18400	178	2840	17700	155	4	13300 M1	20
	Ethylbenzene	2840	3540	111	2840	2830	86	22	393 R1	20
	Toluene	2840	2910	98	2840	2590	86	12	139 J	20
	Xylene (Total)	8530	8180	93	8530	7660	87	7	225 J	20
111113038	Benzene	3120	2910	92	3120	2940	93	1	52.4	20
	Ethylbenzene	3120	2620	84	3120	2690	86	3	11.0 U	20
	Toluene	3120	2680	85	3120	2730	87	2	27.0 J	20
	Xylene (Total)	9360	7970	85	9360	8100	87	2	48.9 U	20
111313092	Benzene	2920	2960	101	2920	2940	101	0	8.5 U	20
	Ethylbenzene	2920	2650	91	2920	2630	90	1	10.3 U	20
	Toluene	2920	2710	93	2920	2700	93	0	18.1 U	20
	Xylene (Total)	8760	7910	90	8760	7940	91	0	45.8 U	20
111513200	Benzene	6920	3940	57	6920	4150	60	5	20.2 U	20
	Ethylbenzene	6920	3080	44	6920	3430	50	11	24.5 U	20
	Toluene	6920	3450	49	6920	3830	55	11	46.3 J	20
	Xylene (Total)	20800	9010	43	20800	10300	49	14	113 J	20
111813252	Benzene	3130	2590	75	3130	2550	74	1	234	20
	Ethylbenzene	3130	1980	62	3130	1880	59	5	51.1 J	20
	Toluene	3130	2000	64	3130	1920	61	4	19.4 U	20
	Xylene (Total)	9390	5900	62	9390	5600	59	5	49.1 U	20
111913305	Benzene	3860	3320	86	3860	3290	85	1	11.2 U	20
	Ethylbenzene	3860	3420	88	3860	3360	87	2	16.0 J	20
	Toluene	3860	3520	91	3860	3430	89	2	24.0 U	20
	Xylene (Total)	11600	10300	89	11600	10100	87	2	60.6 U	20
112013358	Benzene	3300	3040	91	3300	3280	90	8	26.7	20
	Ethylbenzene	3300	2960	89	3300	3230	89	9	11.2 U	20
	Toluene	3300	3020	91	3300	3340	92	10	19.7 U	20
	Xylene (Total)	9920	8920	90	9920	9830	91	10	49.8 U	20

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
112213427	Benzene	6750	4080	60	6750	4230	63	3	19.7 U	20
	Ethylbenzene	6750	3810	56	6750	3780	56	1	23.9 U	20
	Toluene	6750	4130	60	6750	4300	62	4	98.9 J	20
	Xylene (Total)	20300	11500	57	20300	11500	57	0	106 U	20
112613492	Benzene	6210	3760	61	6210	3830	62	2	18.1 U	20
	Ethylbenzene	6210	3550	57	6210	3560	57	0	22.0 U	20
	Toluene	6210	3950	62	6210	3980	63	1	87.1 J	20
	Xylene (Total)	18600	10700	58	18600	10900	58	1	97.5 U	20
120213560	Benzene	3150	2780	88	3150	2980	94	7	21.0 J	20
	Ethylbenzene	3150	2840	89	3150	2900	91	2	40.2 J	20
	Toluene	3150	2800	89	3150	2860	91	2	19.5 U	20
	Xylene (Total)	9440	8270	87	9440	8440	89	2	49.4 U	20
120413619	Benzene	6340	3920	62	6340	4190	66	7	18.5 U	20
	Ethylbenzene	6340	3410	54	6340	3340	53	2	22.5 U	20
	Toluene	6340	3800	59	6340	3880	60	2	46.9 J	20
	Xylene (Total)	19000	10300	54	19000	10000	53	2	99.6 U	20

3.1.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed on each day of analysis and for each analytical batch. None of the analytes recovered outside of the acceptance limits established by the laboratory. The spike solution used by the laboratory does not contain 1,2,4-Trimethylbenzene or 1,3,5-Trimethylbenzene. Therefore there are no spike results for the LCS or MS/MSD for these analytes. No data are qualified due to failed LCS recoveries. The LCS results are summarized in Tables 3-7 and 3-8.

Table 3-7. Sediment Method 8260 LCS Results

Parameter	Rec Limits (%)		QC Batch: 145790			QC Batch: 145943			QC Batch: 146030		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2220	89	2500	2320	93	2500	2330	93
Ethylbenzene	65	137	2500	2510	100	2500	2550	102	2500	2500	100
Toluene	70	130	2500	2530	101	2500	2540	102	2500	2490	99
Xylene (Total)	65	138	7500	7590	101	7500	7630	102	7500	7470	100

Table 3-7. Sediment Method 8260 LCS Results Cont 1

Parameter	Rec Limits (%)		QC Batch: 146371			QC Batch: 146516			QC Batch: 146521		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2150	86	2500	2900	116	2500	2640	106
Ethylbenzene	65	137	2500	2550	102	2500	2650	106	2500	2580	103
Toluene	70	130	2500	2520	101	2500	2620	105	2500	2640	106
Xylene (Total)	65	138	7500	7620	102	7500	7870	105	7500	7870	105

Table 3-7. Sediment Method 8260 LCS Results Cont 2

Parameter	Rec Limits (%)		QC Batch: 146524			QC Batch: 147224			QC Batch: 147429		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2150	86	2500	2600	104	2500	2740	110
Ethylbenzene	65	137	2500	2530	101	2500	2430	97	2500	2590	104
Toluene	70	130	2500	2540	102	2500	2460	99	2500	2650	106
Xylene (Total)	65	138	7500	7680	102	7500	7510	100	7500	7930	106

Table 3-7. Sediment Method 8260 LCS Results Cont 3

Parameter	Rec Limits (%)		QC Batch: 147482			QC Batch: 147662			QC Batch: 147989		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2850	114	2500	2730	109	2500	2680	107
Ethylbenzene	65	137	2500	2570	103	2500	2510	100	2500	2510	100
Toluene	70	130	2500	2650	106	2500	2540	102	2500	2580	103
Xylene (Total)	65	138	7500	7860	105	7500	7690	103	7500	7620	102

Table 3-7. Sediment Method 8260 LCS Results Cont 4

Parameter	Rec Limits (%)		QC Batch: 147996			QC Batch: 148138			QC Batch: 148255		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2000	80	2500	2540	102	2500	2650	106
Ethylbenzene	65	137	2500	1770	71	2500	2620	105	2500	2650	106
Toluene	70	130	2500	1790	72	2500	2700	108	2500	2720	109
Xylene (Total)	65	138	7500	5390	72	7500	7990	107	7500	8030	107

Table 3-7. Sediment Method 8260 LCS Results Cont 5

Parameter	Rec Limits (%)		QC Batch: 148418			QC Batch: 148593			QC Batch: 148883		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2650	106	2500	2650	106	2500	2620	105
Ethylbenzene	65	137	2500	2720	109	2500	2650	106	2500	2670	107
Toluene	70	130	2500	2800	112	2500	2710	108	2500	2750	110
Xylene (Total)	65	138	7500	8290	110	7500	8090	108	7500	8140	109

Table 3-7. Sediment Method 8260 LCS Results Cont 6

Parameter	Rec Limits (%)		QC Batch: 148945			QC Batch: 149038			QC Batch: 149245		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2180	87	2500	2640	106	2500	2630	105
Ethylbenzene	65	137	2500	2560	102	2500	2700	108	2500	2670	107
Toluene	70	130	2500	2530	101	2500	2770	111	2500	2750	110
Xylene (Total)	65	138	7500	7630	102	7500	8170	109	7500	8160	109

Table 3-7. Sediment Method 8260 LCS Results Cont 7

Parameter	Rec Limits (%)		QC Batch: 149392			QC Batch: 149523			QC Batch: 149829		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2640	106	2500	2740	110	2500	2590	104
Ethylbenzene	65	137	2500	2690	108	2500	2710	108	2500	2670	107
Toluene	70	130	2500	2750	110	2500	2800	112	2500	2740	110
Xylene (Total)	65	138	7500	8100	108	7500	8260	110	7500	8150	109

Table 3-8. Water Method 8260 LCS Summary

Parameter	Rec Limits (%)		QC Batch: 200-63941			QC Batch: 200-64060			QC Batch: 200-64525		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	25.6	103	25.0	25.0	100	25.0	25.6	102
1,3,5-Trimethylbenzene	80	120	25.0	25.3	101	25.0	25.1	100	25.0	25.5	102
Benzene	80	125	25.0	25.6	102	25.0	25.3	101	25.0	25.0	100
Ethylbenzene	80	125	25.0	25.2	101	25.0	25.0	100	25.0	26.0	104
m&p-Xylene	80	125	50.0	51.1	102	50.0	50.2	100	50.0	51.7	103
o-Xylene	80	120	25.0	25.3	101	25.0	24.9	100	25.0	26.0	104
Toluene	80	120	25.0	25.9	104	25.0	25.4	102	25.0	25.7	103

Table 3-8. Water Method 8260 LCS Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 200-64717			QC Batch: 200-65166			QC Batch: 200-65230		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	26.4	105	25.0	25.3	101	25.0	25.2	101
1,3,5-Trimethylbenzene	80	120	25.0	26.4	105	25.0	25.5	102	25.0	25.2	101
Benzene	80	125	25.0	25.8	103	25.0	24.7	99	25.0	24.6	98
Ethylbenzene	80	125	25.0	26.5	106	25.0	25.9	104	25.0	24.9	99
m&p-Xylene	80	125	50.0	53.3	107	50.0	52.5	105	50.0	49.8	100
o-Xylene	80	120	25.0	26.6	106	25.0	26.2	105	25.0	24.9	100
Toluene	80	120	25.0	26.1	105	25.0	26.0	104	25.0	24.7	99

Table 3-8. Water Method 8260 LCS Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 200-65297			QC Batch: 200-65502			QC Batch: 200-65582		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	24.9	100	25.0	25.9	104	25.0	24.7	99
1,3,5-Trimethylbenzene	80	120	25.0	25.0	100	25.0	26.3	105	25.0	25.0	100
Benzene	80	125	25.0	24.1	96	25.0	25.0	100	25.0	24.6	98
Ethylbenzene	80	125	25.0	24.6	98	25.0	25.9	104	25.0	25.2	101
m&p-Xylene	80	125	50.0	49.2	98	50.0	51.7	103	50.0	50.7	101
o-Xylene	80	120	25.0	24.6	98	25.0	25.8	103	25.0	25.2	101
Toluene	80	120	25.0	24.2	97	25.0	25.7	103	25.0	24.7	99

Table 3-8. Water Method 8260 LCS Summary Cont 3

Parameter	Rec Limits (%)		QC Batch: 200-65782			QC Batch: 200-66095		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	25.7	103	25.0	24.4	98
1,3,5-Trimethylbenzene	80	120	25.0	26.0	104	25.0	25.9	103
Benzene	80	125	25.0	24.4	98	25.0	25.1	100
Ethylbenzene	80	125	25.0	25.5	102	25.0	26.2	105
m&p-Xylene	80	125	50.0	50.8	102	50.0	51.9	104
o-Xylene	80	120	25.0	25.4	102	25.0	25.8	103
Toluene	80	120	25.0	24.8	99	25.0	25.6	102

3.1.8 Field Duplicates

Field duplicates generally exhibited good agreement for most of analytes with all RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. Some results exceed twice the limit of quantitation. Therefore, the failed analytes in the sample and duplicate only, will be qualified as estimated ("J"). The results of the field duplicate analyses are given in Table 3-9.

Table 3-9. Sediment Method 8260 Field Duplicate Results

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	145		108	113		98.9	24.8	659		242	917		240	32.7
1,3,5-Trimethylbenzene	60.2	J	108	43.1	J	98.9	33.1	101	J	242	179	J	240	55.7
Benzene	15.8	U	43.4	14.4	U	39.6	0.0	4250	M1	96.8	3840		96.0	10.1
Ethylbenzene	19.2	U	108	17.5	U	98.9	0.0	7690		242	5530		240	32.7
Toluene	143		108	162		98.9	12.5	525		242	462	B	240	12.8
Xylene (Total)	93.9	J	325	77.6	U	297	NC	10100		726	7170		720	33.9

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 1

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	25.1	J	58.9	563		114	182.9	8340		7600	12800		384	42.2
1,3,5-Trimethylbenzene	15.8	U	58.9	231		114	174.4	3130	J	7600	3930		384	22.7
Benzene	8.6	U	23.6	36.9	J	45.5	NC	6060		3040	5840		153	3.7
Ethylbenzene	34.4	J	58.9	42.4	J	114	20.8	29100		7600	37200		384	24.4
Toluene	18.3	U	58.9	176		114	NC	2360	U	7600	721		384	NC
Xylene (Total)	55.7	J	177	179	J	341	105.1	20600	J	22800	28000		1150	30.5

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 2

Parameter	Sample ID: 111313084			Sample ID: 111313095			RPD	Sample ID: 111513201			Sample ID: 111513208			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	1610		104	2040		104	23.6	374		128	215		63.7	54.0
1,3,5-Trimethylbenzene	511		104	669		104	26.8	153		128	80.4		63.7	62.2
Benzene	51.4		41.5	38.6	J	41.7	28.4	18.7	U	51.3	9.3	U	25.5	0.0
Ethylbenzene	51.5	J	104	45.5	J	104	12.4	23.1	J	128	15.8	J	63.7	37.5
Toluene	114		104	101	J	104	12.1	127	J	128	58.2	J	63.7	74.3
Xylene (Total)	551		312	539		313	2.2	170	J	385	92.3	J	191	59.2

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 3

Parameter	Sample ID: 111813251			Sample ID: 111813258			RPD	Sample ID: 112213444			Sample ID: 112213446			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	8610		1640	11400		1990	27.9	11.1	U	58.1	11.1	U	58.0	0.0
1,3,5-Trimethylbenzene	1740		1640	2680		1990	42.5	15.6	U	58.1	15.6	U	58.0	0.0
Benzene	440	J	657	539	J	797	20.2	34.4		23.3	17.2	J	23.2	66.7
Ethylbenzene	3080		1640	4310		1990	33.3	10.3	U	58.1	10.3	U	58.0	0.0
Toluene	510	U	1640	619	U	1990	0.0	18.1	U	58.1	18.0	U	58.0	0.0
Xylene (Total)	4580	J	4930	5840	J	5980	24.2	45.6	U	174	45.6	U	174	0.0

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 4

Parameter	Sample ID: 112613504			Sample ID: 112613517			RPD	Sample ID: 120213557			Sample ID: 120213570			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	14400		4010	15600		4030	8.0	18500		4130	19000		5230	2.7
1,3,5-Trimethylbenzene	4040		4010	4530		4030	11.4	5030		4130	5090	J	5230	1.2
Benzene	3550		1600	3830		1610	7.6	6050		1650	6320		2090	4.4
Ethylbenzene	34000		4010	34600		4030	1.7	50700		4130	50700		5230	0.0
Toluene	1240	U	4010	1250	U	4030	0.0	1280	U	4130	1620	U	5230	0.0
Xylene (Total)	24000		12000	25200		12100	4.9	31000		12400	31700		15700	2.2

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 5

Parameter	Sample ID: 111113038			Sample ID: 111113041			RPD	Sample ID: 111913305			Sample ID: 111913307			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	24.5	J	62.4	11.9	U	62.6	NC	50.8	J	77.2	44.5	J	71.9	13.2
1,3,5-Trimethylbenzene	52.1	J	62.4	34.9	J	62.6	39.5	20.7	U	77.2	19.3	U	71.9	0.0
Benzene	52.4		24.9	52.3		25.1	0.2	11.2	U	30.9	10.5	U	28.7	0.0
Ethylbenzene	11.0	U	62.4	11.1	U	62.6	0.0	16.0	J	77.2	14.0	J	71.9	13.3
Toluene	27.0	J	62.4	19.4	U	62.6	NC	24.0	U	77.2	22.3	U	71.9	0.0
Xylene (Total)	48.9	U	187	49.2	U	188	0.0	60.6	U	232	56.4	U	216	0.0

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 6

<i>Parameter</i>	<i>Sample ID: 112013358</i>			<i>Sample ID: 112013364</i>			<i>RPD</i>	<i>Sample ID: 120413619</i>			<i>Sample ID: 120413632</i>			<i>RPD</i>
	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>		<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	
1,2,4-Trimethylbenzene	12.1	U	63.5	2220		1410	197.8	24.2	U	127	33.8	J	127	NC
1,3,5-Trimethylbenzene	17.0	U	63.5	615	J	1410	NC	34.0	U	127	34.1	U	127	0.0
Benzene	26.7		25.4	682		565	184.9	18.5	U	50.7	18.5	U	50.8	0.0
Ethylbenzene	11.2	U	63.5	5440		1410	NC	22.5	U	127	22.5	U	127	0.0
Toluene	19.7	U	63.5	439	U	1410	0.0	46.9	J	127	49.4	J	127	5.2
Xylene (Total)	49.8	U	190	3800	J	4240	NC	99.6	U	381	99.8	U	381	0.0

3.2 SW-846 Method 8270C–Phenols

3.2.1 Summary

SW-846 Method 8270C employs gas chromatographic separation with mass spectroscopic identification for the phenolic compounds of interest.

One sample was extracted outside of the holding time. Sample 110813502 will be qualified with all positive results as estimated (“J”), and non-detect results as estimated (“UJ”). Phenol was requested on sample 120613843 but was not analyzed by the lab.

3.2.2 Method Blanks

The samples were prepared in multiple preparation batches. None of the method blanks associated with these sample analyses showed any contamination for any of the target compounds above the detection limit. Hence, no data are qualified due to method blank contamination.

Note that twenty-three field blanks were also submitted with these samples. None of the field blanks gave any positive results above the reporting limits. No data are qualified due to field blank contamination.

The results for the method blanks are summarized in Tables 3-10 and 3-11.

Table 3-10. Sediment Method 8270 Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 146010	QC Batch: 146197	QC Batch: 146307	QC Batch: 146454	QC Batch: 146598	QC Batch: 146916	QC Batch: 147199	QC Batch: 147542	QC Batch: 147702
2,4-Dimethylphenol	83.3 U								
2-Methylphenol(o-Cresol)	83.3 U								
3&4-Methylphenol(m&p Cresol)	17.4 U								
Phenol	19.8 U								

Table 3-10. Sediment Method 8270 Method Blank Results Summary (µg/Kg) Cont 1

Parameter	QC Batch: 148019	QC Batch: 148145	QC Batch: 148191	QC Batch: 148445	QC Batch: 148589	QC Batch: 148719	QC Batch: 148935	QC Batch: 149089	QC Batch: 149306
2,4-Dimethylphenol	83.3 U								
2-Methylphenol(o-Cresol)	83.3 U								
3&4-Methylphenol(m&p Cresol)	17.4 U								
Phenol	19.8 U								

Table 3-10. Sediment Method 8270 Method Blank Results Summary (µg/Kg) Cont 2

Parameter	QC Batch: 149307	QC Batch: 149651	QC Batch: 149918	QC Batch: 150071	QC Batch: 150173	QC Batch: 150422	QC Batch: 150592
2,4-Dimethylphenol	83.3 U						
2-Methylphenol(o-Cresol)	83.3 U						
3&4-Methylphenol(m&p Cresol)	17.4 U						
Phenol	19.8 U						

Table 3-11. Water Method 8270 Method Blank Results Summary (µg/L)

Parameter	QC Batch: 200-63780	QC Batch: 200-64111	QC Batch: 200-64605	QC Batch: 200-64688	QC Batch: 200-65186	QC Batch: 200-65673	QC Batch: 200-66280
2,4-Dimethylphenol	0.75 U						
		0.75 U				0.75 U	
2-Methylphenol	0.51 U						
		0.51 U				0.51 U	
3 & 4 Methylphenol	1.2 U						
		1.2 U				1.2 U	
Phenol	10 U						
		10 U				10 U	

3.2.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. All reported DFTPP tunes passed the established criteria. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all target analyte results.

All of the initial calibration verification (ICV) and continuing calibration verification (CCV) checks for Method 8270C performed gave acceptable results (i.e., <25% D for most compounds, <40%D for poor performing compounds using the CLP National Functional Guidelines) for all of the target analytes. Consequently, no data are qualified based upon calibration verification results.

3.2.4 Surrogate Compound Recoveries

Three surrogate compounds were spiked into each of the samples.

Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. A few samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Using the guidance from the October 1999 National Functional Guidelines (since the current NFG do not effectively address surrogate compounds), only sample results where at least two surrogate compounds from each fraction (i.e., base/neutral fraction or acid fraction) fail to recover within limits are cause for qualification. Under those conditions only one sample requires qualification of data, sample 102813265. Positive results for analytes in this sample will be qualified as estimated ("J"). Results for analytes reported as not detected are qualified as not detected with greater uncertainty as to the reporting limit ("UJ"). For samples 111913280 and 120613859, positive results for analytes will be qualified as estimated ("J") any analytes reported as not detect will be qualified as unusable ("R") since surrogate recoveries are less than ten percent.

The surrogate recoveries for all samples are presented in Tables 3-12 and 3-13.

Table 3-12. Sediment Method 8270 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
			Limits:	18	130	28	130	30
4087646001	102813264	10	61		77		74	
4087646002	102813265	4	39		27	2q	28	2q
4087646003	102813266	4	66		48		57	
4087646004	102813273	4	67		60		65	
4087646005	102813277	1	33		39		57	
4087646006	102813281	4	78		56		72	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4087646007	102813282	5	57		63		71	
4087646008	102813283	10	49		58		62	
4087646009	102813284	5	60		57		64	
4087646010	102813287	1	43		61		62	
4087646011	102813288	1	50		63		71	
4087646012	102913291	4	41		49		51	
4087646013	102913292	5	63		63		66	
4087646014	102913293	10	51		63		69	
4087646015	102913299	40	0	S4	0	S4	0	S4
4087646016	102913300	10	47		59		65	
4087646017	102913301	4	53		57		75	
4087646018	102913306	1	42		51		62	
4087646019	102913308	4	69		58		59	
4087646020	102913309	2	77		65		67	
4087646021	102913310	10	44		54		55	
4087646022	102913313	2	74		56		60	
4087646023	102913317	10	54		49		51	
4087646024	102913325	1	43		55		59	
4087646025	102913327	10	67		62		60	
4087646026	102913328	10	23		17	4q, S0	16	4q, S0
4087646027	102913329	5	41		32		32	
4087646028	102913338	10	44		47		45	
4087646029	102913343	1	33		54		74	
4087646030	102913348	1	42		54		60	
4087646031	102913349	10	58		49		55	
4087646032	102913350	5	60		50		58	
4087646033	102913351	5	62		49		58	
4087646034	102913355	10	31		30		35	
4087646035	102913361	5	38		49		64	
4088053001	110113375	5	72		53		61	
4088053002	110113376	5	69		61		63	
4088053003	110113377	5	64		51		58	
4088053004	110113380	4	74		54		66	
4088053005	110113386	10	45		46		48	
4088053006	110113389	10	41		41		44	
4088053007	110113390	1	25		48		55	
4088053008	110113392	5	56		44		56	
4088053009	110113393	10	53		50		62	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
			0	S4	0	S4	0	S4
4088053010	110113394	40	0	S4	0	S4	0	S4
4088053011	110113395	5	65		44		47	
4088053012	110113399	5	60		48		52	
4088053013	110113406	10	38		31		40	
4088053014	110113408	1	43		56		63	
4088053015	110113410	10	51		40		49	
4088053016	110113411	10	45		35		42	
4088053017	110113412	10	54		38		50	
4088053018	110113424	5	52		37		50	
4088053019	110113429	1	24		42		52	
4088053020	110413432	1	86		64		74	
4088053021	110413433	10	48		34		39	
4088053022	110413434	4	66		48		59	
4088053023	110413441	20	45		44		51	
4088053024	110413443	1	34		51		62	
4088053025	110413448	5	63		55		54	
4088053026	110413449	5	51		47		50	
4088053027	110413450	5	61		60		60	
4088053028	110413457	50	33		46		45	
4088053029	110413458	2	37		53		58	
4088053030	110413460	10	34		40		40	
4088053031	110413461	4	67		65		73	
4088053032	110413462	100	0	S4	0	S4	0	S4
4088053033	110413463	5	48		51		55	
4088053034	110413466	10	35		40		39	
4088053035	110413470	50	0	S4	0	S4	0	S4
4088053036	110413471	1	38		56		60	
4088482001	110813001	2	46		43		46	
4088482002	110813002	2	65		63		65	
4088482003	110813003	4	50		53		57	
4088482004	110813017	5	57		56		62	
4088482005	110813019	5	48		45		49	
4088482006	110813020	1	49		44		51	
4088482008	111113024	1	54		46		51	
4088482009	111113025	4	69		56		60	
4088482010	111113026	10	41		57		51	
4088482011	111113030	5	53		39		47	
4088482012	111113034	5	57		42		47	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol- <i>d</i> ₆	
4088482013	111113038	1	63		64		64	
4088482014	111113041	1	71		68		66	
4088482015	111213043	1	36		31		30	
4088482016	111213044	4	55		66		62	
4088482017	111213045	1	66		71		69	
4088482018	111213062	10	45		43		45	
4088482019	111213063	1	46		53		59	
4088482020	111213064	1	57		55		57	
4088486001	110813504	10	52		41		53	
4088486002	110813505	5	67		53		58	
4088486003	110813506	10	63		39		57	
4088486004	110813510	10	37		44		46	
4088486005	110813515	20	27		47		47	
4088486006	110813517	1	27		46		53	
4088486007	110813518	1	22		43		45	
4088622001	111313070	1	62		64		66	
4088622002	111313071	1	59		62		66	
4088622003	111313072	1	69		58		62	
4088622004	111313084	5	53		46		58	
4088622005	111313085	100	0	S4	0	S4	0	S4
4088622006	111313087	8	63		64		69	
4088622007	111313092	1	36		55		64	
4088622008	111313095	5	63		65		63	
4088622009	111313096	1	54		56		58	
4088622010	111313097	2	54		50		53	
4088622011	111313098	2	52		44		48	
4088622012	111313110	4	46		54		53	
4088622013	111313114	1	61		67		67	
4088622014	111413118	2	35		39		37	
4088622015	111413119	2	54		52		54	
4088622016	111413120	2	35		37		37	
4088622017	111413134	20	33		40		45	
4088622018	111413137	1	62		65		70	
4088622019	111413139	1	55		53		55	
4088622020	111413140	1	51		44		48	
4088622021	111413141	1	57		56		60	
4088622022	111413153	1	58		56		58	
4088622023	111413154	25	57		58		60	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol- <i>d</i> ₆	
4088622024	111413155	1	34		53		58	
4088879001	111513159	20	0	S4	0	S4	0	S4
4088879002	111513160	20	0	S4	0	S4	0	S4
4088879003	111513161	10	24		43		41	
4088879004	111513178	20	29		50		52	
4088879005	111513179	1	48		67		72	
4088879006	111513182	20	35		50		49	
4088879007	111513183	10	34		54		52	
4088879008	111513184	5	51		60		65	
4088879009	111513187	20	50		50		57	
4088879010	111513192	50	55		57		58	
4088879011	111513193	2	72		62		72	
4088879012	111513194	1	60		83		86	
4088879013	111513199	1	81		70		74	
4088879014	111513200	1	54		56		61	
4088879015	111513201	1	64		68		70	
4088879016	111813210	1	64		59		65	
4088879017	111813211	1	51		61		65	
4088879018	111813212	1	59		65		67	
4088879019	111813220	20	59		61		65	
4088879020	111813221	1	61		80		83	
4088879021	111813223	5	49		49		42	
4088879022	111813224	1	58		62		63	
4088879023	111813225	25	35		44		48	
4088879024	111813235	20	34		46		47	
4088879025	111813236	4	72		72		77	
4088879026	111813237	1	55		82		81	
4088879027	111813239	1	76		61		61	
4088879028	111813240	1	76		57		62	
4088879029	111813241	1	76		62		65	
4088879030	111813251	4	86		71		82	
4088879031	111813252	10	72		81		87	
4088879032	111813258	4	80		68		74	
4088879033	111913260	1	88		59		67	
4088879034	111913261	1	80		54		67	
4088879035	111913262	1	86		70		83	
4088879036	111913274	4	65		63		66	
4088879037	111913276	20	57		88		93	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4088879038	111913279	1	76		66		77	
4088879039	111913280	1	0	9q, S0	0	9q, S0	0	9q, S0
4088879040	111913281	1	62		62		68	
4088879041	111913292	5	57		52		70	
4088879042	111913293	1	65		66		73	
4088879043	111913298	5	71		58		83	
4088879044	111913299	2	78		71		84	
4088879045	111913300	1	65		60		75	
4088879046	111913305	1	49		54		60	
4088879047	111913307	1	58		61		70	
4088879048	111513208	1	54		50		55	
4089023001	112013310	1	81		63		74	
4089023002	112013311	20	59		35		47	
4089023003	112013312	1	74		55		64	
4089023004	112013318	5	55		50		58	
4089023005	112013327	5	64		49		62	
4089023006	112013328	1	64		68		83	
4089023007	112013331	1	78		63		73	
4089023008	112013332	4	45		27	S0	32	
4089023009	112013333	1	73		58		74	
4089023010	112013340	5	54		50		60	
4089023011	112013343	20	41		61		65	
4089023012	112013344	1	64		62		78	
4089023013	112013346	1	49		45		55	
4089023014	112013347	5	36		42		41	
4089023015	112013348	1	64		66		84	
4089023016	112013358	1	100		64		72	
4089023017	112013364	1	55		66		77	
4089023018	112113366	1	97		65		67	
4089023019	112113367	5	78		47		56	
4089023020	112113368	5	51		34		40	
4089023021	112113371	1	96		60		68	
4089023022	112113382	20	55		43		46	
4089023023	112113383	1	54		46		55	
4089023024	112113385	1	50		57		61	
4089023025	112113386	1	68		41		53	
4089023026	112113387	1	66		48		50	
4089023027	112113389	1	81		50		56	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol- <i>d</i> ₆	
4089023028	112113399	5	47		36		38	
4089023029	112113400	1	59		42		53	
4089202001	112213406	1	81		62		66	
4089202002	112213407	1	71		44		53	
4089202003	112213408	10	65		44		60	
4089202004	112213422	20	39		40		44	
4089202005	112213423	1	34		62		67	
4089202006	112213424	1	45		50		63	
4089202007	112213425	4	84		51		60	
4089202008	112213426	2	76		43		53	
4089202009	112213427	1	87		56		61	
4089202010	112213443	5	58		39		49	
4089202011	112213444	1	50		47		55	
4089202012	112213446	1	44		49		60	
4089202013	112213447	1	67		61		67	
4089202014	112213448	1	50		45		46	
4089202015	112213449	1	57		48		53	
4089202016	112213450	1	55		56		56	
4089202017	112513452	1	82		56		64	
4089202018	112513453	1	79		55		59	
4089202019	112513454	1	62		57		61	
4089202020	112513466	50	0	S4	0	S4	0	S4
4089202021	112513467	20	37		43		43	
4089202022	112513468	1	58		57		60	
4089202023	112513469	1	63		66		69	
4089202024	112513473	2	80		51		53	
4089202025	112513474	5	69		45		47	
4089202026	112513475	5	77		50		56	
4089202027	112513485	5	45		26	S0	32	
4089202028	112513486	1	120		106		117	
4089362001	112613490	1	59		50		50	
4089362002	112613491	1	65		51		54	
4089362003	112613492	1	66		53		53	
4089362004	112613503	5	60		53		55	
4089362005	112613504	10	53		53		57	
4089362006	112613505	10	47		53		56	
4089362007	112613506	1	51		44		52	
4089362008	112613517	20	43		43		43	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4089509001	120213522	1	89		48		60	
4089509002	120213523	1	76		49		64	
4089509003	120213524	1	69		51		60	
4089509004	120213532	20	76		40		51	
4089509005	120213535	1	56		48		62	
4089509006	120213545	1	18		26	SO	36	
4089509007	120213546	5	40		55		55	
4089509008	120213547	1	65		49		48	
4089509009	120213557	10	63		50		53	
4089509010	120213558	10	69		65		73	
4089509011	120213559	10	63		51		58	
4089509012	120213560	1	67		57		68	
4089509013	120213570	10	57		51		54	
4089509014	120313572	1	58		45		46	
4089509015	120313573	1	59		53		53	
4089509016	120313574	1	66		49		50	
4089509017	120313581	10	49		45		49	
4089509018	120313582	1	74		52		62	
4089509019	120313588	10	81		68		69	
4089509020	120313589	4	50		41		40	
4089509021	120313590	1	84		53		59	
4089509022	120313602	40	43		47		50	
4089509023	120313603	10	7	5q, SO	17	5q, SO	26	5q, SO
4089509024	120313604	1	23		49		52	
4089665001	120413617	1	90		62		73	
4089665002	120413618	1	61		42		45	
4089665003	120413619	1	74		58		63	
4089665004	120413629	25	46		41		43	
4089665005	120413630	1	43		62		68	
4089665006	120413632	2	74		55		61	
4089665007	120413633	2	75		48		57	
4089665008	120413634	4	38		43		47	
4089665009	120413635	20	50		42		46	
4089665010	120413641	5	56		53		60	
4089665011	120413642	1	61		51		55	
4089665012	120413645	20	46		52		49	
4089665013	120413646	12.5	68		55		54	
4089665014	120413653	40	65		54		60	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4089665015	120413654	1	53		55		60	
4089818001	120613845	2	68		57		64	
4089818002	120613846	2	71		57		65	
4089818003	120613847	2	45		43		49	
4089818004	120613851	2	45		46		52	
4089818005	120613859	4	4	2q, 50	4	2q, 50	4	2q, 50
4089818006	120613860	1	36		53		60	

Table 3-13. Water Method 8270 Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₅	
			Limits:	20	155	15	190	10
200-19227-36	102813262	1	43		49		30	
200-19227-38	102913290	1	34		47		29	
200-19267-1	103013363	1	57		43		28	
200-19364-1	110113373	1	68		48		30	
200-19364-3	110413431	1	66		49		30	
200-19364-4	110513474	1	66		47		29	
200-19434-1	110713490	1	68		53		35	
200-19557-1	110813502	1	56		42		27	
200-19557-3	111113023	1	59		44		29	
200-19557-4	111213042	1	67		46		29	
200-19664-1	111513157	1	66		43		28	
200-19664-3	111813209	1	77		51		33	
200-19664-4	111913259	1	76		47		30	
200-19709-1	112013308	1	56		41		28	
200-19709-3	112113365	1	58		39		26	
200-19777-1	112213404	1	46		33		23	
200-19777-3	112513451	1	57		35		23	
200-19822-9	120213518	1	63		45		31	
200-19876-1	120213520	1	61		41		27	
200-19876-3	120313571	1	65		48		32	
200-19939-1	120413615	1	72		47		32	
200-19939-3	120513657	1	74		51		35	

3.2.5 Internal Standard Areas

No sample analyses reported in this data set have internal standard areas less than 50% or greater than 200% of the area response of the corresponding continuing calibration verification. No data from Method 8270 will be qualified based upon internal standard responses.

3.2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on multiple samples.

None of the target analytes for the MS/MSD analyses samples recovered outside the limits used by the laboratory. The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The matrix spike/matrix spike duplicate results are summarized in Table 3-14.

Table 3-14. Sediment Method 8270 MS/MSD Recoveries

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
102813277	2,4-Dimethylphenol	1950	2240	115	2320	119	4	97.5 U	29
	2-Methylphenol(o-Cresol)	1950	1730	89	1790	92	3	97.5 U	29
	3&4-Methylphenol(m&p Cresol)	1950	1710	88	1780	91	4	20.3 U	29
	Phenol	1950	1380	71	1560	80	12	23.2 U	30
102813288	2,4-Dimethylphenol	2030	2210	109	2190	108	1	101 U	29
	2-Methylphenol(o-Cresol)	2030	1700	84	1890	93	10	101 U	29
	3&4-Methylphenol(m&p Cresol)	2030	1690	83	1760	87	4	21.1 U	29
	Phenol	2030	1580	78	1650	81	4	24.1 U	30
102913343	2,4-Dimethylphenol	2020	2390	118	2200	109	8	101 U	29
	2-Methylphenol(o-Cresol)	2020	1870	93	1680	83	11	101 UCH	29
	3&4-Methylphenol(m&p Cresol)	2020	1860	92	1670	83	11	21.0 UCH	29
	Phenol	2020	1710	85	1560	78	9	24.0 U	30
110113376	2,4-Dimethylphenol	3930	4020	103	3290	84	20	980 U	29
	2-Methylphenol(o-Cresol)	3930	2380	61	2500	64	5	980 U	29
	3&4-Methylphenol(m&p Cresol)	3930	3540	63	3830	70	8	1080 J	29
	Phenol	3930	2310	55	2260	54	2	233 UD3	30

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
110413443	2,4-Dimethylphenol	1900	2250	119	2250	119	0	94.7 U	29
	2-Methylphenol(o-Cresol)	1900	1620	86	1690	89	4	94.7 U	29
	3&4-Methylphenol(m&p Cresol)	1900	1520	80	1550	82	2	19.8 U	29
	Phenol	1900	1420	75	1450	77	2	22.5 U	30
110413458	2,4-Dimethylphenol	1900	2050	106	1820	94	12	190 U	29
	2-Methylphenol(o-Cresol)	1900	1470	77	1500	79	2	190 U	29
	3&4-Methylphenol(m&p Cresol)	1900	1540	75	1570	77	2	112 J	29
	Phenol	1900	1540	81	1460	77	5	45.1 UD3	30
111113038	2,4-Dimethylphenol	2080	2460	118	2400	116	3	104 U	29
	2-Methylphenol(o-Cresol)	2080	1590	77	1690	81	6	104 U	29
	3&4-Methylphenol(m&p Cresol)	2080	1520	73	1620	78	7	21.7 U	29
	Phenol	2080	1510	73	1530	74	1	24.7 U	30
111313092	2,4-Dimethylphenol	1950	2110	108	2290	117	8	97.3 U	29
	2-Methylphenol(o-Cresol)	1950	1610	82	1660	85	3	97.3 U	29
	3&4-Methylphenol(m&p Cresol)	1950	1570	81	1680	86	7	20.3 U	29
	Phenol	1950	1440	74	1600	82	10	23.1 U	30
111413155	2,4-Dimethylphenol	1960	1770	91	1880	96	6	97.6 U	29
	2-Methylphenol(o-Cresol)	1960	1180	60	1280	65	8	97.6 U	29
	3&4-Methylphenol(m&p Cresol)	1960	1120	57	1200	62	7	20.3 U	29
	Phenol	1960	1170	60	1200	62	2	23.2 U	30
111513200	2,4-Dimethylphenol	4620	5560	120	5180	112	7	231 U	29
	2-Methylphenol(o-Cresol)	4620	3640	79	3520	76	3	231 U	29
	3&4-Methylphenol(m&p Cresol)	4620	3880	76	3960	78	2	377 J	29
	Phenol	4620	3580	77	3320	72	7	54.9 U	30
111813252	2,4-Dimethylphenol	2090	2480	119	2790	134	12	1040 U	29
	2-Methylphenol(o-Cresol)	2090	1900 J	91	1810	87	5	1040 U	29
	3&4-Methylphenol(m&p Cresol)	2090	1830 J	88	1980	95	7	218 U	29
	Phenol	2090	1810 J	87	1800	86	5	248 UD3	29
112013358	2,4-Dimethylphenol	4230	4490	106	4480	106	0	212 U	29
	2-Methylphenol(o-Cresol)	4230	3860	91	3910	92	1	212 U	29
	3&4-Methylphenol(m&p Cresol)	4230	3730	88	3790	89	2	44.1 U	29
	Phenol	4230	3750	88	3630	86	3	50.3 U	29
111913305	2,4-Dimethylphenol	2580	2540	99	2670	104	5	129 U	29
	2-Methylphenol(o-Cresol)	2580	1670	65	1830	71	9	129 U	29
	3&4-Methylphenol(m&p Cresol)	2580	1610	62	1740	68	8	26.8 U	29
	Phenol	2580	1600	62	1890	73	17	30.6 U	30

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
112213427	2,4-Dimethylphenol	4510	2930	65	2310	51	24	450 U	29
	2-Methylphenol(o-Cresol)	4510	2190	49	1780	39	21	450 U	29
	3&4-Methylphenol(m&p Cresol)	4510	2170	46	1700	35	24	107 J	29
	Phenol	4510	2010	42	1550	32	25	113 JM1	30
112613492	2,4-Dimethylphenol	4150	4360	105	4110	99	6	207 U	29
	2-Methylphenol(o-Cresol)	4150	3490	84	3370	81	3	207 U	29
	3&4-Methylphenol(m&p Cresol)	4150	3470	81	3560	84	3	101 J	29
	Phenol	4150	2940	71	2660	64	10	49.2 U	30
120213560	2,4-Dimethylphenol	2100	2010	96	1920	92	4	105 U	29
	2-Methylphenol(o-Cresol)	2100	1780	85	1550	74	14	105 U	29
	3&4-Methylphenol(m&p Cresol)	2100	1720	82	1520	73	12	21.9 U	29
	Phenol	2100	1730	82	1440	68	19	25.0 U	30
120413619	2,4-Dimethylphenol	8450	7540	89	8000	95	6	423 U	29
	2-Methylphenol(o-Cresol)	8450	6670	79	7470	88	11	423 U	29
	3&4-Methylphenol(m&p Cresol)	8450	7010	80	7570	86	8	277 J	29
	Phenol	8450	5820	68	6800	80	15	101 U	29

3.2.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples.

Some of the target analytes for the laboratory control samples recovered below the limits used by the laboratory. Positive results for the failed analytes in the batches are qualified as estimated ("J"). Values reported as non-detects will be qualified as rejected ("R"). The laboratory control sample results are given in Tables 3-15 and 3-16.

Table 3-15. Sediment Method 8270 LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 146010			QC Batch: 146197			QC Batch: 146307		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1690	101	1670	1510	90	1670	1750	105
2-Methylphenol	65	130	1670	1520	91	1670	1210	72	1670	1290	77
3&4-Methylphenol	63	130	1670	1490	90	1670	1170	70	1670	1260	76
Phenol	62	130	1670	1650	99	1670	1410	85	1670	1400	84

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 146454			QC Batch: 146598			QC Batch: 146916		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1270	76	1670	1590	96	1670	1680	101
2-Methylphenol	65	130	1670	1030	62	1670	1340	81	1670	1470	88
3&4-Methylphenol	63	130	1670	1030	62	1670	1390	83	1670	1400	84
Phenol	62	130	1670	1040	63	1670	1310	78	1670	1410	85

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 147199			QC Batch: 147542			QC Batch: 147702		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1760	106	1670	1780	107	1670	1700	102
2-Methylphenol	65	130	1670	1300	78	1670	1320	79	1670	1450	87
3&4-Methylphenol	63	130	1670	1260	76	1670	1320	79	1670	1370	82
Phenol	62	130	1670	1340	80	1670	1290	78	1670	1430	86

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 3

Parameter	Rec Limits (%)		QC Batch: 148019			QC Batch: 148145			QC Batch: 148191		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1340	80	1670	1450	87	1670	1790	107
2-Methylphenol	65	130	1670	1430	86	1670	1170	70	1670	1410	85
3&4-Methylphenol	63	130	1670	1390	83	1670	1170	70	1670	1460	88
Phenol	62	130	1670	1470	88	1670	1170	70	1670	1510	90

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 4

Parameter	Rec Limits (%)		QC Batch: 148445			QC Batch: 148589			QC Batch: 148719		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1940	116	1670	1760	106	1670	1550	93
2-Methylphenol	65	130	1670	1480	89	1670	1360	82	1670	1240	74
3&4-Methylphenol	63	130	1670	1460	87	1670	1420	85	1670	1230	74
Phenol	62	130	1670	1530	92	1670	1250	75	1670	1160	70

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 5

Parameter	Rec Limits (%)		QC Batch: 148935			QC Batch: 149089			QC Batch: 149306		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1610	97	1670	1700	102	1670	1300	78
2-Methylphenol	65	130	1670	1150	69	1670	1300	78	1670	1430	86
3&4-Methylphenol	63	130	1670	1120	67	1670	1270	76	1670	1440	86
Phenol	62	130	1670	1190	71	1670	1290	77	1670	1390	84

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 6

Parameter	Rec Limits (%)		QC Batch: 149307			QC Batch: 149651			QC Batch: 149918		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1360	82	1670	1220	73	1670	1530	92
2-Methylphenol	65	130	1670	1360	81	1670	1150	69	1670	1360	82
3&4-Methylphenol	63	130	1670	1340	80	1670	1150	69	1670	1330	80
Phenol	62	130	1670	1400	84	1670	1040	62	1670	1330	80

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 7

Parameter	Rec Limits (%)		QC Batch: 150071			QC Batch: 150173			QC Batch: 150422		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1500	90	1670	1330	80	1670	1500	90
2-Methylphenol	65	130	1670	1380	83	1670	1270	76	1670	1330	80
3&4-Methylphenol	63	130	1670	1320	79	1670	1280	77	1670	1300	78
Phenol	62	130	1670	1280	77	1670	1300	78	1670	1290	77

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 8

Parameter	Rec Limits (%)		QC Batch: 150592		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1450	87
2-Methylphenol	65	130	1670	1390	83
3&4-Methylphenol	63	130	1670	1380	83
Phenol	62	130	1670	1420	85

Table 3-16. Water Method 8270 LCS Summary

Parameter	Rec Limits (%)		QC Batch: 200-63780			QC Batch: 200-64111			QC Batch: 200-64605		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2,4-Dimethylphenol	45	125	50.0	14.7	29	50.0	33.8	68	50.0	43.6	87
	45	125				50.0	35.6	71			
2-Methylphenol	55	110	50.0	37.0	74	50.0	39.0	78	50.0	45.3	91
	55	110				50.0	39.3	79			
3 & 4 Methylphenol	50	100	50.0	30.9	62	50.0	36.3	73	50.0	42.1	84
	50	100				50.0	36.2	72			
Phenol	20	70	50.0	19.4	39	50.0	22.2	44	50.0	26.0	52
	20	70				50.0	22.1	44			

Table 3-16. Water Method 8270 LCS Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 200-64688			QC Batch: 200-65186			QC Batch: 200-65673		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2,4-Dimethylphenol	45	125	50.0	32.6	65	50.0	35.8	72	50.0	29.4	59
	45	125							50.0	25.5	51
2-Methylphenol	55	110	50.0	37.9	76	50.0	40.2	80	50.0	35.2	70
	55	110							50.0	36.6	73
3 & 4 Methylphenol	50	100	50.0	34.7	69	50.0	36.7	73	50.0	32.5	65
	50	100							50.0	33.7	67
Phenol	20	70	50.0	20.5	41	50.0	22.7	45	50.0	18.8	38
	20	70							50.0	19.4	39

Table 3-16. Water Method 8270 LCS Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 200-66280		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)
2,4-Dimethylphenol	45	125	50.0	31.4	63
	45	125			
2-Methylphenol	55	110	50.0	41.7	83
	55	110			
3 & 4 Methylphenol	50	100	50.0	36.6	73
	50	100			
Phenol	20	70	50.0	23.0	46
	20	70			

3.2.8 Field Duplicates

Field duplicates generally exhibited good agreement for most of analytes with all RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate “NDs”, however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. None of the results outside the 30% RPD are greater than 2x the LOQ therefore no data are qualified based on the field duplicate results.

The results of the field duplicate analyses are given in Table 3-17.

Table 3-17. Sediment Method 8270 Field Duplicate Results

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	723	U	1450	659	U	1320	0.0	101	U	202	100	U	200	0.0
2-Methylphenol	723	UL2	1450	659	U	1320	0.0	101	UCH	202	100	U	200	0.0
3&4-Methylphenol	535	JL2	1450	155	J	1320	110.1	21.0	UCH	202	20.9	U	200	0.0
Phenol	172	UCH, D3	1450	157	UD3	1320	0.0	24.0	U	202	23.8	U	200	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 1

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	98.2	U	197	948	U	1900	0.0	7910	U	15900	1600	U	3200	0.0
2-Methylphenol	98.2	U	197	948	U	1900	0.0	7910	U	15900	1600	U	3200	0.0
3&4-Methylphenol	20.5	U	197	650	J	1900	NC	1650	U	15900	333	U	3200	0.0
Phenol	23.4	U	197	226	UD3	1900	0.0	1880	UD3	15900	380	UD3	3200	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 2

Parameter	Sample ID: 111313084			Sample ID: 111313095			RPD	Sample ID: 111513201			Sample ID: 111513208			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	866	U	1730	869	U	1740	0.0	214	U	428	106	U	213	0.0
2-Methylphenol	866	U	1730	869	U	1740	0.0	214	U	428	106	U	213	0.0
3&4-Methylphenol	317	J	1730	642	J	1740	67.8	424	J	428	268		213	45.1
Phenol	206	UD3	1730	207	UD3	1740	0.0	50.8	U	428	61.0	J	213	NC

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 3

Parameter	Sample ID: 111813251			Sample ID: 111813258			RPD	Sample ID: 112213444			Sample ID: 112213446			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	548	U	1100	664	U	1330	0.0	96.9	U	194	96.7	U	194	0.0
2-Methylphenol	548	U	1100	664	U	1330	0.0	96.9	U	194	96.7	U	194	0.0
3&4-Methylphenol	219	J	1100	271	J	1330	21.2	20.2	U	194	20.2	U	194	0.0
Phenol	207	JD3	1100	158	UD3	1330	NC	23.0	U	194	23.0	U	194	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 4

Parameter	Sample ID: 112613504			Sample ID: 112613517			RPD	Sample ID: 120213557			Sample ID: 120213570			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	1670	U	3350	3360	U	6730	0.0	1720	U	3450	1740	U	3500	0.0
2-Methylphenol	1670	U	3350	3360	U	6730	0.0	1720	U	3450	1740	U	3500	0.0
3&4-Methylphenol	348	U	3350	701	U	6730	0.0	359	U	3450	378	J	3500	NC
Phenol	397	UD3	3350	799	UD3	6730	0.0	410	UD3	3450	415	UD3	3500	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 5

Parameter	Sample ID: 111113038			Sample ID: 111113041			RPD	Sample ID: 111913305			Sample ID: 111913307			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	104	U	208	104	U	209	0.0	129	U	258	120	U	240	0.0
2-Methylphenol	104	U	208	104	U	209	0.0	129	U	258	120	U	240	0.0
3&4-Methylphenol	21.7	U	208	21.8	U	209	0.0	26.8	U	258	25.0	U	240	0.0
Phenol	24.7	U	208	24.8	U	209	0.0	30.6	U	258	28.5	U	240	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 6

Parameter	Sample ID: 112013358			Sample ID: 112013364			RPD	Sample ID: 120413619			Sample ID: 120413632			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	212	U	424	106	U	212	0.0	423	U	847	847	U	1700	0.0
2-Methylphenol	212	U	424	106	U	212	0.0	423	U	847	847	U	1700	0.0
3&4-Methylphenol	44.1	U	424	22.1	U	212	0.0	277	J	847	255	J	1700	8.3
Phenol	50.3	U	424	25.2	U	212	0.0	101	U	847	201	UD3	1700	0.0

3.3 SW-846 Method 8270C/SIM –PAHs

3.3.1 Summary

SW-846 Method 8270C/SIM employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM).

Some of the samples were extracted outside of the prescribed holding time. Samples 110813002, 111213045, 111513160, 112013318, 112013348, 112213427, 112613492, 120313573, 110813502, and 091913716 will be qualified with all positive results as estimated (“J”), and non-detect results as estimated (“UJ”). Sample 110713490 and the associated method blank were not spiked with the surrogate standards during the initial extraction. The samples were subsequently re-extracted outside holding time. For this sample all positive results will be qualified as estimated (“J”), and non-detect results as estimated (“UJ”).

3.3.2 Method Blanks, Equipment Blanks, Field Blanks

The samples were prepared in twenty-eight different preparation batches for sediment samples and five different batches for water samples (equipment blanks). None of the sediment method blanks showed any level of contamination. The method blank associated with one batch of water samples, 200-66593, had multiple analyte failures. The associated sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a “U”. Results that are above the reporting limit, but less than five times the reporting limit, will be qualified as estimated (“J”) due to the low levels of the results. Results more than five times the reporting limit will not be qualified

The results for the method blanks are summarized in Tables 3-18 and 3-19.

Twenty-six equipment (rinsate) blanks were submitted for analysis. Most of the equipment blanks showed some level of contamination. The associated sediment sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a (“U”). Results that are above the reporting limit, but less than five times the reporting limit, will be qualified as estimated (“J”) due to the low levels of the results. Results more than five times the reporting limit will not be qualified.

Table 3-18. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 145897	QC Batch: 146022	QC Batch: 146159	QC Batch: 146602	QC Batch: 146759	QC Batch: 147045	QC Batch: 147046	QC Batch: 147198	QC Batch: 147679	QC Batch: 147844
2-Methylnaphthalene	8.3 U									
Acenaphthene	8.3 U									
Acenaphthylene	8.3 U									
Anthracene	8.3 U									
Benzo(a)anthracene	8.3 U									
Benzo(a)pyrene	3.0 U									
Benzo(b)fluoranthene	8.3 U									
Benzo(g,h,i)perylene	8.3 U									
Benzo(k)fluoranthene	2.9 U									
Chrysene	8.3 U									
Dibenz(a,h)anthracene	8.3 U									
Fluoranthene	8.3 U									
Fluorene	8.3 U									
Indeno(1,2,3-cd)pyrene	8.3 U									
Naphthalene	8.3 U									
Phenanthrene	8.3 U									
Pyrene	8.3 U									

**Table 3-18. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)
Cont 1**

Parameter	QC Batch: 148018	QC Batch: 148053	QC Batch: 148109	QC Batch: 148256	QC Batch: 148259	QC Batch: 148430	QC Batch: 148444	QC Batch: 148586	QC Batch: 148722
2-Methylnaphthalene	8.3 U								
Acenaphthene	8.3 U								
Acenaphthylene	8.3 U								
Anthracene	8.3 U								
Benzo(a)anthracene	8.3 U								
Benzo(a)pyrene	3.0 U								
Benzo(b)fluoranthene	8.3 U								
Benzo(g,h,i)perylene	8.3 U								
Benzo(k)fluoranthene	2.9 U								
Chrysene	8.3 U								
Dibenz(a,h)anthracene	8.3 U								
Fluoranthene	8.3 U								
Fluorene	8.3 U								
Indeno(1,2,3-cd)pyrene	8.3 U								
Naphthalene	8.3 U								
Phenanthrene	8.3 U								
Pyrene	8.3 U								

**Table 3-18. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)
Cont 2**

Parameter	QC Batch: 148723	QC Batch: 149197	QC Batch: 149348	QC Batch: 149754	QC Batch: 149755	QC Batch: 150041	QC Batch: 150176	QC Batch: 150317	QC Batch: 150398
2-Methylnaphthalene	8.3 U								
Acenaphthene	8.3 U								
Acenaphthylene	8.3 U								
Anthracene	8.3 U								
Benzo(a)anthracene	8.3 U								
Benzo(a)pyrene	3.0 U								
Benzo(b)fluoranthene	8.3 U								
Benzo(g,h,i)perylene	8.3 U								
Benzo(k)fluoranthene	2.9 U								
Chrysene	8.3 U								
Dibenz(a,h)anthracene	8.3 U								
Fluoranthene	8.3 U								
Fluorene	8.3 U								
Indeno(1,2,3-cd)pyrene	8.3 U								
Naphthalene	8.3 U								
Phenanthrene	8.3 U								
Pyrene	8.3 U								

Table 3-19. Water Method 8270-SIM Method Blank Results Summary (µg/L)

<i>Parameter</i>	<i>QC Batch: 200-64903</i>	<i>QC Batch: 200-65095</i>	<i>QC Batch: 200-65550</i>	<i>QC Batch: 200-65973</i>
2-Methylnaphthalene	0.0012 U	0.0012 U	0.0012 U	0.0012 U
Acenaphthene	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Acenaphthylene	0.0010 U	0.0010 U	0.0010 U	0.0010 U
Anthracene	0.00070 U	0.00070 U	0.00070 U	0.00070 U
Benzo[a]anthracene	0.0012 U	0.0012 U	0.0012 U	0.0012 U
Benzo[a]pyrene	0.00051 U	0.00051 U	0.00051 U	0.00051 U
Benzo[b]fluoranthene	0.0010 U ^	0.0010 U	0.0010 U	0.0010 U
Benzo[g,h,i]perylene	0.0020 U	0.0020 U	0.0020 U	0.0020 U
Benzo[k]fluoranthene	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Chrysene	0.00091 U	0.00091 U	0.00091 U	0.00091 U
Dibenz(a,h)anthracene	0.0038 U	0.0038 U	0.0038 U	0.0038 U
Fluoranthene	0.00057 U	0.00057 U	0.00057 U	0.00057 U
Fluorene	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Indeno[1,2,3-cd]pyrene	0.0031 U	0.0031 U	0.0031 U	0.0031 U
Naphthalene	0.0015 U	0.0015 U	0.0015 U	0.0015 U
Phenanthrene	0.00079 U	0.00079 U	0.00079 U	0.00079 U
Pyrene	0.0012 U	0.0012 U	0.0012 U	0.0012 U

Table 3-19. Water Method 8270-SIM Method Blank Results Summary (µg/L) Cont 1

<i>Parameter</i>	<i>QC Batch: 200-65764</i>	<i>QC Batch: 200-66593</i>
2-Methylnaphthalene	0.0012 U	0.0012 U
	0.0012 U	0.0238
Acenaphthene	0.0011 U	0.0011 U
	0.0011 U	0.0251
Acenaphthylene	0.0010 U	0.0010 U
	0.0010 U	0.0238
Anthracene	0.00070 U	0.00070 U
	0.00070 U	0.0253
Benzo[a]anthracene	0.0012 U	0.0012 U
	0.0012 U	0.0297
Benzo[a]pyrene	0.00051 U	0.00051 U
	0.00051 U	0.0276
Benzo[b]fluoranthene	0.0010 U	0.0010 U
	0.0010 U	0.0268
Benzo[g,h,i]perylene	0.0020 U	0.0020 U
	0.0020 U	0.0261
Benzo[k]fluoranthene	0.0011 U	0.0011 U
	0.0011 U	0.0255
Chrysene	0.00091 U	0.00091 U
	0.00091 U	0.0273
Dibenz(a,h)anthracene	0.0038 U	0.0038 U
	0.0038 U	0.0296
Fluoranthene	0.00057 U	0.00057 U
	0.00057 U	0.0263
Fluorene	0.0011 U	0.0011 U
	0.0011 U	0.0259
Indeno[1,2,3-cd]pyrene	0.0031 U	0.0031 U
	0.0031 U	0.0262
Naphthalene	0.0015 U	0.0015 U
	0.0015 U	0.0262
Phenanthrene	0.00079 U	0.00079 U
	0.00079 U	0.0249
Pyrene	0.0012 U	0.0012 U
	0.0012 U	0.0246

3.3.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 30% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. No data are qualified as a consequence of the continuing calibration data.

The peak shapes and chromatographic resolution for the isomers benzo(b)fluoranthene and benzo(k)fluoranthene evident in the sample chromatograms for the samples indicate that the two isomers are not adequately resolved to be quantitated separately as the laboratory attempted to do. The laboratory's report narratives noted this issue but stopped short of reporting the two isomers as a coeluting pair (as is done for *m/p*-xylene). Consequently all positive results for benzo(b)fluoranthene and benzo(k)fluoranthene in all samples for these two isomers are qualified as estimated ("J").

3.3.4 Internal Standard Areas

The analysis for a few samples yielded an internal standard area less than 50% of the area response of the corresponding continuing calibration verification. Samples 111213063, 111213064, 111313087, 111313095, 111313097, 111313114, 111413134, 111413137, 111413155, 112513453, 112613491, and 120213523 recovered low for all internal standards. Sample 111813241 recovered low for perylene-*d*₁₂. For samples where the internal standard response is less than 50% of the area response of the corresponding continuing calibration verification, the June 2008 CLP National Functional Guidelines directs the reviewer to qualify positive results associated with the low response as estimated ("J") while non-detected values are qualified as unusable ("R").

3.3.5 Surrogate Compound Recoveries

Surrogates were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., PAHs), the surrogates reported should be adequate to monitor recovery in the analyses.

Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. A few samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Sample 120313573 with no dilution had a recovery below the lower limit. Since the failed recovery is not attributable to dilution, positive results for this sample are qualified as estimated ("J") and non-detects as unusable ("R"). Results for sample 121113524 recovered above the upper limit and will be qualified as estimated ("J") for all positive results.

The surrogate recoveries for all samples are presented in Tables 3-20 and 3-21.

Table 3-20. Sediment Method 8270-SIM Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
			Limits:	40	130	40
4087646002	102813265	5	37	3q, S0	34	3q, S0
4087646003	102813266	20	42		47	
4087646004	102813273	20	52		50	
4087646005	102813277	1	68		66	
4087646006	102813281	8	51		53	
4087646008	102813283	8	48		48	
4087646009	102813284	5	60		61	
4087646010	102813287	1	70		68	
4087646011	102813288	1	66		62	
4087646013	102913292	8	77		81	
4087646014	102913293	10	73		78	
4087646015	102913299	200	0	S4	0	S4
4087646017	102913301	20	61		65	
4087646018	102913306	10	85		91	
4087646020	102913309	8	64		68	
4087646021	102913310	8	59		59	
4087646022	102913313	20	0	S4	0	S4
4087646024	102913325	1	65		63	

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
4087646026	102913328	8	71		72	
4087646027	102913329	20	56		60	
4087646028	102913338	20	51		51	
4087646029	102913343	1	74		71	
4087646030	102913348	1	65		63	
4087646032	102913350	20	54		59	
4087646033	102913351	80	55		59	
4087646034	102913355	40	0	S4	0	S4
4087646035	102913361	125	0	S4	0	S4
4088053002	110113376	40	58		67	
4088053003	110113377	2	56		59	
4088053004	110113380	5	67		69	
4088053006	110113389	80	0	S4	0	S4
4088053007	110113390	1	81		78	
4088053008	110113392	4	63		63	
4088053010	110113394	1	62		67	
4088053011	110113395	2	65		63	
4088053012	110113399	20	69		72	
4088053013	110113406	12.5	64		62	
4088053014	110113408	1	67		65	
4088053016	110113411	20	0	S4	0	S4
4088053017	110113412	20	50		55	
4088053018	110113424	5	74		75	
4088053019	110113429	1	70		68	
4088053021	110413433	2	74		76	
4088053022	110413434	4	68		72	
4088053023	110413441	400	0	S4	0	S4
4088053024	110413443	1	73		70	
4088053026	110413449	1	78		77	
4088053027	110413450	4	62		63	
4088053028	110413457	250	0	S4	0	S4
4088053029	110413458	1	62		61	
4088053030	110413460	400	0	S4	0	S4
4088053032	110413462	20	51		55	
4088053033	110413463	5	61		60	
4088053034	110413466	10	48		51	
4088053036	110413471	250	0	S4	0	S4
4088482002	110813002	20	0	S4	0	S4

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
4088482003	110813003	2	52		59	
4088482004	110813017	20	57		57	
4088482006	110813020	1	90		85	
4088482007	110813022	40	61		62	
4088482009	111113025	100	0	S4	0	S4
4088482010	111113026	8	47		52	
4088482011	111113030	8	50		50	
4088482012	111113034	2	41		41	
4088482013	111113038	1	91		86	
4088482014	111113041	1	84		76	
4088482016	111213044	1	56		45	
4088482017	111213045	1	54		43	
4088482018	111213062	4	54		51	
4088482019	111213063	1	72		72	
4088482020	111213064	1	84		83	
4088486002	110813505	20	54		59	
4088486003	110813506	1	69		67	
4088486004	110813510	10	59		61	
4088486006	110813517	200	0	S4	0	S4
4088486007	110813518	4	77		79	
4088622002	111313071	2	59		58	
4088622003	111313072	1	67		56	
4088622004	111313084	5	41		40	
4088622006	111313087	20	0	S4	0	S4
4088622007	111313092	1	87		80	
4088622008	111313095	1	68		68	
4088622010	111313097	1	75		76	
4088622011	111313098	2	60		49	
4088622012	111313110	4	52		43	
4088622013	111313114	1	80		76	
4088622015	111413119	8	46		46	
4088622016	111413120	1	48		43	
4088622017	111413134	20	0	S4	0	S4
4088622018	111413137	1	86		85	
4088622020	111413140	1	70		64	
4088622021	111413141	1	74		62	
4088622022	111413153	20	0	S4	0	S4
4088622024	111413155	1	86		88	

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
4088879002	111513160	2	65		77	
4088879003	111513161	1	67		53	
4088879004	111513178	8	121		92	
4088879005	111513179	1	81		65	
4088879007	111513183	10	47		52	
4088879008	111513184	20	52		49	
4088879010	111513192	200	0	S4	0	S4
4088879011	111513193	10	50		46	
4088879012	111513194	20	69		64	
4088879015	111513201	2	61		51	
4088879017	111813211	1	63		56	
4088879018	111813212	1	54		48	
4088879019	111813220	40	64		58	
4088879020	111813221	4	97		75	
4088879022	111813224	1	66		59	
4088879023	111813225	2	60		56	
4088879025	111813236	100	0	S4	0	S4
4088879026	111813237	1	55		44	
4088879028	111813240	1	58		52	
4088879029	111813241	1	63		53	
4088879030	111813251	40	52		49	
4088879031	111813252	5	67		54	
4088879032	111813258	40	62		58	
4088879034	111913261	4	59		54	
4088879035	111913262	1	51		44	
4088879036	111913274	80	0	S4	0	S4
4088879037	111913276	1	59		48	
4088879039	111913280	4	52		40	
4088879040	111913281	2	55		43	
4088879041	111913292	80	0	S4	0	S4
4088879042	111913293	1	66		55	
4088879044	111913299	10	86		62	
4088879045	111913300	5	72		56	
4088879046	111913305	1	88		70	
4088879047	111913307	1	72		59	
4088879048	111513208	1	58		53	
4089023002	112013311	1	54		48	
4089023003	112013312	1	58		50	

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl	Terphenyl- <i>d</i> ₁₄
4089023004	112013318	2	53	53
4089023006	112013328	5	91	75
4089023008	112013332	2	73	78
4089023009	112013333	1	67	57
4089023010	112013340	2	59	62
4089023011	112013343	500	0 S4	0 S4
4089023012	112013344	1	86	74
4089023014	112013347	10	53	58
4089023015	112013348	2	56	58
4089023016	112013358	5	74	59
4089023017	112013364	5	79	65
4089023019	112113367	1	74	68
4089023020	112113368	2	59	50
4089023021	112113371	2	55	55
4089023022	112113382	100	0 S4	0 S4
4089023023	112113383	1	90	78
4089023025	112113386	1	73	67
4089023026	112113387	1	56	49
4089023027	112113389	1	59	53
4089023028	112113399	20	79	48
4089023029	112113400	4	95	83
4089202002	112213407	1	43	48
4089202003	112213408	80	0 S4	0 S4
4089202004	112213422	1	46	48
4089202005	112213423	1	65	55
4089202006	112213424	1	56	48
4089202008	112213426	1	46	54
4089202009	112213427	1	49	45
4089202010	112213443	4	41	42
4089202011	112213444	1	76	62
4089202012	112213446	1	61	59
4089202014	112213448	1	44	50
4089202015	112213449	1	59	61
4089202016	112213450	1	67	70
4089202018	112513453	1	58	69
4089202019	112513454	1	63	67
4089202021	112513467	80	0 S4	0 S4
4089202022	112513468	1	66	64

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
4089202023	112513469	1	65		65	
4089202025	112513474	2	48		51	
4089202026	112513475	8	44		47	
4089202027	112513485	20	49		47	
4089202028	112513486	1	65		63	
4089362002	112613491	1	67		81	
4089362003	112613492	1	66		67	
4089362005	112613504	8	53		58	
4089362006	112613505	160	0	S4	0	S4
4089362007	112613506	1	74		74	
4089362008	112613517	160	0	S4	0	S4
4089509002	120213523	1	43		51	
4089509003	120213524	1	48		50	
4089509004	120213532	20	0	S4	0	S4
4089509005	120213535	20	0		0	
4089509007	120213546	1	46		58	
4089509008	120213547	1	50		53	
4089509009	120213557	400	0	S4	0	S4
4089509010	120213558	160	0	S4	0	S4
4089509012	120213560	1	74		73	
4089509013	120213570	400	0	S4	0	S4
4089509015	120313573	1	39	2q, S0	33	2q, S0
4089509016	120313574	1	47		48	
4089509017	120313581	160	0	S4	0	S4
4089509018	120313582	1	82		82	
4089509020	120313589	2	44		57	
4089509021	120313590	1	51		55	
4089509022	120313602	400	0	S4	0	S4
4089509024	120313604	1	64		63	
4089665002	120413618	1	71		73	
4089665003	120413619	1	75		87	
4089665004	120413629	160	0	S4	0	S4
4089665005	120413630	1	84		84	
4089665006	120413632	1	70		79	
4089665008	120413634	8	70		85	
4089665009	120413635	20	60		74	
4089665010	120413641	8	74		79	
4089665011	120413642	1	78		77	

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
			0	S4	0	S4
4089665013	120413646	200	0	S4	0	S4
4089665014	120413653	100	0	S4	0	S4
4089665015	120413654	10	76		82	
4089818002	120613846	4	58		64	
4089818003	120613847	2	76		77	
4089818004	120613851	2	63		66	
4089818005	120613859	40	43		47	
4089818006	120613860	1	70		70	

Table 3-21. Water Method 8270-SIM Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	2-Methyl-naphthalene- <i>d</i> ₁₀		Benzo(a)pyrene- <i>d</i> ₁₂		Fluoranthene- <i>d</i> ₁₀		Fluorene- <i>d</i> ₁₀	
			Limits:	50	110	10	160	50	120	60
200-19227-36	102813262	1	85		102		88		89	
200-19227-38	102913290	1	84		90		85		82	
200-19267-1	103013363	1	81		67		77		71	
200-19364-1	110113373	1	92		69		88		81	
200-19364-3	110413431	10	94		81		93		88	
200-19364-4	110513474	1	90		80		88		81	
200-19434-1	110713490	1	74		73		74		70	
200-19557-1	110813502	1	78		80		82		76	
200-19557-3	111113023	1	83		80		84		80	
200-19557-4	111213042	1	84		84		87		81	
200-19664-1	111513157	1	82		86		83		78	
200-19664-3	111813209	1	82		83		79		76	
200-19664-4	111913259	1	90		90		90		82	
200-19709-1	112013308	1	63		58		68		62	
200-19709-3	112113365	1	77		65		75		74	
200-19777-1	112213404	1	72		65		70		70	
200-19777-3	112513451	1	70		65		68		67	
200-19822-9	120213518	1	82		74		76		74	
200-19876-1	120213520	1	84		86		91		86	
200-19876-3	120313571	1	86		94		90		94	

Lab Sample Number	Field ID	Dilution	2-Methyl-naphthalene- d_{10}		Benzo(a)pyrene- d_{12}		Fluoranthene- d_{10}		Fluorene- d_{10}	
200-19939-1	120413615	1	77		89		87		83	
200-19939-3	120513657	1	73		89		85		89	
200-20035-1	120613843	1	79		87		86		93	
200-20035-3	120913863	1	74		81		84		89	
200-20074-1	121013867	6.7	80		87		84		83	
200-20074-2	121113524	50	89		118		134	D	130	D

3.3.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on multiple samples.

In many cases some of the target analytes for the MS/MSD analyses samples recovered outside the limits used by the laboratory. The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data. The MS/MSD sample results are given in Table 3-22.

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 102813277

Parameter	MS Sample ID: 102813277			MSD Sample ID: 102813277			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	389	331	54	389	321	52	3	119	35
Acenaphthene	389	341	59	389	334	57	2	112	35
Acenaphthylene	389	299	73	389	307	76	3	12.4 J	25
Anthracene	389	365	68	389	356	66	3	98.3	38
Benzo(a)anthracene	389	337	69	389	322	66	4	66	30
Benzo(a)pyrene	389	441	93	389	413	86	6	78.8	33
Benzo(b)fluoranthene	389	467	110	389	441	103	6	39	44
Benzo(g,h,i)perylene	389	423	99	389	417	97	1	37.4	33
Benzo(k)fluoranthene	389	393	87	389	398	88	1	54.8	37
Chrysene	389	350	71	389	334	66	5	75.1	38
Dibenz(a,h)anthracene	389	395	99	389	405	101	2	9.9 J	27
Fluoranthene	389	368	58	389	339	50	8	143	50
Fluorene	389	334	72	389	333	72	0	54.4	32
Indeno(1,2,3-cd)pyrene	389	403	96	389	406	97	1	29	28
Naphthalene	389	451	26	389	385	9	16	350 M1	40
Phenanthrene	389	425	41	389	368	26	14	265 M1	46
Pyrene	389	392	51	389	341	37	14	194	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 102913343

<i>Parameter</i>	<i>MS Sample ID: 102913343</i>			<i>MSD Sample ID: 102913343</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	403	663	58	403	493	16	29	427 M1	35
Acenaphthene	403	343	61	403	354	64	3	96	35
Acenaphthylene	403	303	63	403	326	69	7	48.6	25
Anthracene	403	377	62	403	371	61	1	126	38
Benzo(a)anthracene	403	345	57	403	351	59	2	115	30
Benzo(a)pyrene	403	358	60	403	374	63	4	118	33
Benzo(b)fluoranthene	403	349	67	403	387	76	10	79.4	44
Benzo(g,h,i)perylene	403	271	56	403	301	63	11	46.6	33
Benzo(k)fluoranthene	403	314	59	403	350	68	11	76.3	37
Chrysene	403	367	58	403	364	57	1	135	38
Dibenz(a,h)anthracene	403	271	62	403	314	73	15	19.0 J	27
Fluoranthene	403	391	52	403	379	49	3	181 L2	50
Fluorene	403	368	66	403	361	64	2	101	32
Indeno(1,2,3-cd)pyrene	403	276	58	403	313	67	13	43	28
Naphthalene	403	1370	182	403	2980	581	74	634 M1, R1	40
Phenanthrene	403	638	57	403	478	18	29	407 M1	46
Pyrene	403	457	53	403	411	41	10	244	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 110113376

<i>Parameter</i>	<i>MS Sample ID: 110113376</i>			<i>MSD Sample ID: 110113376</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	783	784 U	-239	783	739	-242		2640 M6	35
Acenaphthene	783	784 U	-422	783	728	-424		4050 M6	35
Acenaphthylene	783	784 U	-374	783	715	-378		3680 M6	25
Anthracene	783	971 J	-1870	783	965	-1870		15600 M6	38
Benzo(a)anthracene	783	1690	-2490	783	1720	-2490	2	21200 M6	30
Benzo(a)pyrene	783	1790	-2220	783	1800	-2220	1	19200 M6	33
Benzo(b)fluoranthene	783	1870	-2010	783	1820	-2010	3	17600 M6	44
Benzo(g,h,i)perylene	783	1240 J	-909	783	1220	-912		8370 M6	33
Benzo(k)fluoranthene	783	1660	-1900	783	1720	-1890	4	16600 M6	37
Chrysene	783	2080	-2570	783	2170	-2560	4	22200 M6	38
Dibenz(a,h)anthracene	783	843 J	-362	783	840	-362		3680 M6	27
Fluoranthene	783	3170	-5450	783	3320	-5440	5	45900 M6	50
Fluorene	783	784 U	-1130	783	763	-1130		9660 M6	32
Indeno(1,2,3-cd)pyrene	783	1090 J	-1020	783	1070	-1020		9060 M6	28
Naphthalene	783	784 U	-184	783	740	-174		2100 M6	40
Phenanthrene	783	2220	-5440	783	2290	-5440	3	44900 M6	46
Pyrene	783	2860	-4100	783	3000	-4080	5	35000 M6	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 110413458

<i>Parameter</i>	<i>MS Sample ID: 110413458</i>			<i>MSD Sample ID: 110413458</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	379	344	61	379	350	62	2	114	35
Acenaphthene	379	362	68	379	370	70	2	104	35
Acenaphthylene	379	286	73	379	283	73	1	9.5 U	25
Anthracene	379	387	80	379	376	77	3	83.5	38
Benzo(a)anthracene	379	305	71	379	303	71	1	34.7	30
Benzo(a)pyrene	379	317	74	379	314	74	1	34.9	33
Benzo(b)fluoranthene	379	324	80	379	322	80	1	18.7 J	44
Benzo(g,h,i)perylene	379	296	74	379	292	73	1	17.1 J	33
Benzo(k)fluoranthene	379	303	75	379	295	73	2	19.9	37
Chrysene	379	316	73	379	317	73	0	38.9	38
Dibenz(a,h)anthracene	379	283	74	379	278	72	2	9.5 U	27
Fluoranthene	379	354	74	379	353	73	0	74.8	50
Fluorene	379	325	75	379	325	75	0	40.4	32
Indeno(1,2,3-cd)pyrene	379	287	73	379	283	71	2	11.7 J	28
Naphthalene	379	649	-11	379	661	-8	2	691 M1	40
Phenanthrene	379	438	69	379	441	70	1	175	46
Pyrene	379	385	74	379	388	74	1	106	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 111113038

<i>Parameter</i>	<i>MS Sample ID: 111113038</i>			<i>MSD Sample ID: 111113038</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	415	337	79	415	358	84	6	10.4 U	35
Acenaphthene	415	375	85	415	402	91	7	22.6	35
Acenaphthylene	415	356	85	415	385	92	8	10.4 U	25
Anthracene	415	407	89	415	427	94	5	34.5	38
Benzo(a)anthracene	415	362	68	415	407	79	12	77.4	30
Benzo(a)pyrene	415	427	83	415	470	93	10	81.7	33
Benzo(b)fluoranthene	415	410	77	415	478	93	15	90.4	44
Benzo(g,h,i)perylene	415	380	81	415	404	86	6	44.9	33
Benzo(k)fluoranthene	415	433	86	415	431	86	0	74.2	37
Chrysene	415	408	71	415	443	79	8	114	38
Dibenz(a,h)anthracene	415	357	82	415	374	86	5	15.5 J	27
Fluoranthene	415	499	59	415	475	54	5	252	50
Fluorene	415	368	84	415	379	86	3	20.1 J	32
Indeno(1,2,3-cd)pyrene	415	366	79	415	392	85	7	36.6	28
Naphthalene	415	333	78	415	348	82	4	10.4 U	40
Phenanthrene	415	466	66	415	413	53	12	193	46
Pyrene	415	469	66	415	489	71	4	196	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 111313092

<i>Parameter</i>	<i>MS Sample ID: 111313092</i>			<i>MSD Sample ID: 111313092</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	389	292	49	389	315	55	8	102	35
Acenaphthene	389	301	56	389	319	60	6	84.4	35
Acenaphthylene	389	287	68	389	304	72	6	23.8	25
Anthracene	389	329	46	389	351	52	7	149	38
Benzo(a)anthracene	389	290	30	389	315	37	8	172	30
Benzo(a)pyrene	389	306	36	389	330	42	8	164	33
Benzo(b)fluoranthene	389	322	50	389	340	55	5	128	44
Benzo(g,h,i)perylene	389	306	58	389	329	64	7	80.6	33
Benzo(k)fluoranthene	389	293	45	389	318	52	8	116	37
Chrysene	389	297	29	389	324	35	8	186 M1	38
Dibenz(a,h)anthracene	389	293	68	389	309	73	6	27.1	27
Fluoranthene	389	316	3	389	347	11	9	304 M1	50
Fluorene	389	298	58	389	320	64	7	71.6	32
Indeno(1,2,3-cd)pyrene	389	295	57	389	312	61	6	72.9	28
Naphthalene	389	289	37	389	307	42	6	145	40
Phenanthrene	389	349	-8	389	381	1	9	379 M1	46
Pyrene	389	318	-1	389	352	8	10	322 M1	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 111813252

<i>Parameter</i>	<i>MS Sample ID: 111813252</i>			<i>MSD Sample ID: 111813252</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	417	549	107	417	292	45	61	102 JR1	35
Acenaphthene	417	436	96	417	281	59	43	52.2 UR1	35
Acenaphthylene	417	284	68	417	236	56	19	52.2 U	25
Anthracene	417	377	87	417	270	61	33	52.2 U	38
Benzo(a)anthracene	417	308	74	417	250	60	21	52.2 U	30
Benzo(a)pyrene	417	323	77	417	267	64	19	18.6 U	33
Benzo(b)fluoranthene	417	318	76	417	244	58	26	52.2 U	44
Benzo(g,h,i)perylene	417	239	57	417	185	44	25	52.2 U	33
Benzo(k)fluoranthene	417	313	75	417	275	66	13	18.4 U	37
Chrysene	417	311	72	417	255	58	20	52.2 U	38
Dibenz(a,h)anthracene	417	284	68	417	229	55	22	52.2 U	27
Fluoranthene	417	361	83	417	258	58	34	52.2 U	50
Fluorene	417	381	88	417	263	60	37	52.2 UR1	32
Indeno(1,2,3-cd)pyrene	417	273	65	417	217	52	23	52.2 U	28
Naphthalene	417	1130	-88	417	435	-254	89	1500 M1, R1	40
Phenanthrene	417	599	131	417	310	62	64	52.2 UR1	46
Pyrene	417	390	88	417	264	58	39	52.2 U	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 111913305

<i>Parameter</i>	<i>MS Sample ID: 111913305</i>			<i>MSD Sample ID: 111913305</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	514	594	10	514	497	-9	18	542 M1	35
Acenaphthene	514	428	48	514	415	46	3	179	35
Acenaphthylene	514	350	65	514	362	68	3	14.6 J	25
Anthracene	514	437	64	514	433	63	1	109	38
Benzo(a)anthracene	514	374	65	514	374	65	0	39.5	30
Benzo(a)pyrene	514	473	86	514	478	86	1	33.2	33
Benzo(b)fluoranthene	514	480	88	514	486	89	1	26.1	44
Benzo(g,h,i)perylene	514	459	86	514	468	88	2	16.9 J	33
Benzo(k)fluoranthene	514	431	81	514	443	83	3	15.4 J	37
Chrysene	514	384	66	514	387	66	1	45	38
Dibenz(a,h)anthracene	514	456	88	514	470	90	3	12.9 U	27
Fluoranthene	514	434	66	514	416	62	4	97	50
Fluorene	514	408	60	514	407	60	0	100	32
Indeno(1,2,3-cd)pyrene	514	452	86	514	461	87	2	12.9 U	28
Naphthalene	514	589	19	514	455	-7	26	493 M1	40
Phenanthrene	514	566	45	514	512	34	10	336	46
Pyrene	514	455	65	514	430	60	6	120	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 112013358

<i>Parameter</i>	<i>MS Sample ID: 112013358</i>			<i>MSD Sample ID: 112013358</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	423	657	91	423	317	11	70	270 M1, R1	35
Acenaphthene	423	355	73	423	299	60	17	52.9 U	35
Acenaphthylene	423	276	64	423	273	63	1	52.9 U	25
Anthracene	423	306	70	423	302	69	1	52.9 U	38
Benzo(a)anthracene	423	290	66	423	281	64	3	52.9 U	30
Benzo(a)pyrene	423	322	74	423	316	72	2	18.8 U	33
Benzo(b)fluoranthene	423	302	71	423	307	73	1	52.9 U1q	44
Benzo(g,h,i)perylene	423	321	76	423	314	74	2	52.9 U	33
Benzo(k)fluoranthene	423	319	75	423	309	73	3	18.6 U1q	37
Chrysene	423	303	69	423	290	66	4	52.9 U	38
Dibenz(a,h)anthracene	423	322	76	423	316	75	2	52.9 U	27
Fluoranthene	423	293	66	423	288	65	2	52.9 U	50
Fluorene	423	296	68	423	286	65	4	52.9 U	32
Indeno(1,2,3-cd)pyrene	423	319	75	423	288	68	10	52.9 U	28
Naphthalene	423	3330	232	423	515	-433	146	2350 M1, R1	40
Phenanthrene	423	314	66	423	302	64	4	52.9 U	46
Pyrene	423	297	66	423	291	64	2	52.9 U	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 112213427

<i>Parameter</i>	<i>MS Sample ID: 112213427</i>			<i>MSD Sample ID: 112213427</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	1800	1150	53	1800	1060	48	8	198	35
Acenaphthene	1800	1080	55	1800	983	50	9	84.8 J	35
Acenaphthylene	1800	1030	55	1800	948	50	8	45.0 U	25
Anthracene	1800	1190	56	1800	1110	51	7	191	38
Benzo(a)anthracene	1800	1290	49	1800	1210	44	7	412	30
Benzo(a)pyrene	1800	1490	54	1800	1350	46	10	513	33
Benzo(b)fluoranthene	1800	1610	60	1800	1450	51	11	538	44
Benzo(g,h,i)perylene	1800	1540	60	1800	1440	55	6	450	33
Benzo(k)fluoranthene	1800	1390	45	1800	1310	41	5	577	37
Chrysene	1800	1480	45	1800	1370	39	7	678	38
Dibenz(a,h)anthracene	1800	1260	64	1800	1200	61	5	110	27
Fluoranthene	1800	1940	28	1800	1740	16	11	1440 M1	50
Fluorene	1800	1090	54	1800	983	48	10	121	32
Indeno(1,2,3-cd)pyrene	1800	1480	62	1800	1380	57	6	359	28
Naphthalene	1800	1080	51	1800	990	46	9	163 2q	40
Phenanthrene	1800	1500	36	1800	1360	28	10	843	46
Pyrene	1800	1840	32	1800	1670	23	9	1270 M1	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 120213560

<i>Parameter</i>	<i>MS Sample ID: 120213560</i>			<i>MSD Sample ID: 120213560</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	419	562	88	419	493	71	13	193	35
Acenaphthene	419	400	80	419	347	67	14	64.7	35
Acenaphthylene	419	351	80	419	281	63	22	16.6 J	25
Anthracene	419	405	85	419	326	66	22	50.2	38
Benzo(a)anthracene	419	346	76	419	273	59	23	27.7	30
Benzo(a)pyrene	419	371	82	419	308	67	19	28.1	33
Benzo(b)fluoranthene	419	359	81	419	292	65	21	21.0 J	44
Benzo(g,h,i)perylene	419	318	73	419	235	53	30	10.9 J	33
Benzo(k)fluoranthene	419	363	83	419	289	66	23	12.5 J	37
Chrysene	419	364	79	419	291	61	22	33.3	38
Dibenz(a,h)anthracene	419	341	80	419	266	62	25	10.5 U	27
Fluoranthene	419	387	81	419	305	61	24	47.5	50
Fluorene	419	380	82	419	318	67	18	36.2	32
Indeno(1,2,3-cd)pyrene	419	343	80	419	265	61	26	10.5 U	28
Naphthalene	419	813	89	419	780	81	4	440	40
Phenanthrene	419	446	75	419	384	60	15	130	46
Pyrene	419	399	78	419	316	58	23	71.8	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 112613492

<i>Parameter</i>	<i>MS Sample ID: 112613492</i>			<i>MSD Sample ID: 112613492</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	1660	1130	64	1660	69.1	0		73.1 JH2, M1	35
Acenaphthene	1660	1150	66	1660	67.3	0		63.9 JH2, M1	35
Acenaphthylene	1660	1120	65	1660	66.3	1		43.6 JH2, M1	25
Anthracene	1660	1480	81	1660	76.7	-4		141 H2, M1	38
Benzo(a)anthracene	1660	1620	78	1660	146	-10	167	319 H2, M1, R1	30
Benzo(a)pyrene	1660	1930	93	1660	177	-13	166	388 H2, M1, R1	33
Benzo(b)fluoranthene	1660	1950	96	1660	211	-9	161	360 H2, M1, R1	44
Benzo(g,h,i)perylene	1660	1590	80	1660	136	-8	168	267 H2, M1, R1	33
Benzo(k)fluoranthene	1660	1790	82	1660	167	-16	166	427 H2, M1, R1	37
Chrysene	1660	1820	82	1660	177	-18	165	468 H2, M1, R1	38
Dibenz(a,h)anthracene	1660	1510	87	1660	140	4	166	77.7 JH2, M1, R1	27
Fluoranthene	1660	2440	88	1660	229	-45	166	976 H2, M1, R1	50
Fluorene	1660	1220	69	1660	63.8	-1		72.6 JH2, M1	32
Indeno(1,2,3-cd)pyrene	1660	1490	76	1660	130	-6	168	228 H2, M1, R1	28
Naphthalene	1660	1070	59	1660	82.6	-1		92.4 2q, H2, M1	40
Phenanthrene	1660	1880	81	1660	130	-25	174	541 H2, M1, R1	46
Pyrene	1660	2340	87	1660	213	-42	167	903 H2, M1, R1	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 120413619

<i>Parameter</i>	<i>MS Sample ID: 120413619</i>			<i>MSD Sample ID: 120413619</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	1690	1320	72	1690	1220	66	8	106	35
Acenaphthene	1690	1320	70	1690	1310	69	1	144	35
Acenaphthylene	1690	1300	72	1690	1270	70	2	85.9	25
Anthracene	1690	1450	65	1690	1550	71	6	353	38
Benzo(a)anthracene	1690	1640	43	1690	1760	50	7	918	30
Benzo(a)pyrene	1690	1870	45	1690	1990	52	6	1110	33
Benzo(b)fluoranthene	1690	2020	57	1690	1990	56	1	1050	44
Benzo(g,h,i)perylene	1690	1610	51	1690	1580	49	2	743	33
Benzo(k)fluoranthene	1690	1680	37	1690	1930	53	14	1040	37
Chrysene	1690	1800	34	1690	2010	46	11	1230 M1	38
Dibenz(a,h)anthracene	1690	1520	76	1690	1510	76	0	227	27
Fluoranthene	1690	2280	-3	1690	2530	12	11	2340 M1	50
Fluorene	1690	1390	72	1690	1390	72	0	175	32
Indeno(1,2,3-cd)pyrene	1690	1660	61	1690	1530	54	8	627	28
Naphthalene	1690	1060	57	1690	1080	58	2	101	40
Phenanthrene	1690	1880	24	1690	2010	32	7	1470 M1	46
Pyrene	1690	2210	1	1690	2490	18	12	2190 M1	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 120613860

<i>Parameter</i>	<i>MS Sample ID: 120613860</i>			<i>MSD Sample ID: 120613860</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	406	291	65	406	288	64	1	27.2	35
Acenaphthene	406	279	65	406	275	64	1	15.8 J	35
Acenaphthylene	406	270	66	406	268	66	1	10.2 U	25
Anthracene	406	291	66	406	290	65	0	24.2	38
Benzo(a)anthracene	406	261	62	406	259	61	1	10.9 J	30
Benzo(a)pyrene	406	271	65	406	300	72	10	6.7 J	33
Benzo(b)fluoranthene	406	270	65	406	279	67	3	10.2 U	44
Benzo(g,h,i)perylene	406	307	75	406	306	74	0	10.2 U	33
Benzo(k)fluoranthene	406	292	71	406	284	69	3	3.6 U	37
Chrysene	406	276	65	406	275	65	0	12.4 J	38
Dibenz(a,h)anthracene	406	299	74	406	298	73	0	10.2 U	27
Fluoranthene	406	275	60	406	275	60	0	31.5	50
Fluorene	406	277	64	406	274	63	1	17.4 J	32
Indeno(1,2,3-cd)pyrene	406	286	70	406	287	70	0	10.2 U	28
Naphthalene	406	272	57	406	267	56	2	41.0	40
Phenanthrene	406	283	49	406	283	49	0	83.6	46
Pyrene	406	272	60	406	275	61	1	26.5	49

3.3.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. None of the analytes recovered outside of the acceptance limits established by the laboratory. No data are qualified due to failed LCS recoveries. The laboratory control sample results are given in Tables 3-23 and 24.

Table 3-23. Sediment Method 8270-SIM LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 145897			QC Batch: 146022			QC Batch: 146159		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	228	68	333	196	59	333	190	57
Acenaphthene	55	130	333	242	73	333	220	66	333	204	61
Acenaphthylene	55	130	333	223	67	333	203	61	333	198	59
Anthracene	66	130	333	258	77	333	243	73	333	220	66
Benzo(a)anthracene	55	130	333	220	66	333	206	62	333	196	59
Benzo(a)pyrene	56	130	333	268	81	333	266	80	333	248	75
Benzo(b)fluoranthene	53	130	333	288	87	333	265	80	333	252	76
Benzo(g,h,i)perylene	51	130	333	232	69	333	268	81	333	259	78
Benzo(k)fluoranthene	52	130	333	258	77	333	279	84	333	261	78
Chrysene	58	130	333	234	70	333	226	68	333	207	62
Dibenz(a,h)anthracene	55	130	333	235	70	333	300	90	333	256	77
Fluoranthene	62	130	333	222	67	333	213	64	333	205	61
Fluorene	58	130	333	241	72	333	223	67	333	203	61
Indeno(1,2,3-cd)pyrene	54	130	333	240	72	333	286	86	333	255	77
Naphthalene	41	130	333	204	61	333	178	53	333	182	55
Phenanthrene	60	130	333	238	71	333	224	67	333	200	60
Pyrene	51	130	333	240	72	333	215	65	333	202	61

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 146602			QC Batch: 146759			QC Batch: 147045		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	181	54	333	211	63	333	215	64
Acenaphthene	55	130	333	205	62	333	236	71	333	246	74
Acenaphthylene	55	130	333	199	60	333	230	69	333	239	72
Anthracene	66	130	333	239	72	333	253	76	333	273	82
Benzo(a)anthracene	55	130	333	224	67	333	224	67	333	234	70
Benzo(a)pyrene	56	130	333	242	73	333	241	72	333	243	73
Benzo(b)fluoranthene	53	130	333	254	76	333	244	73	333	248	74
Benzo(g,h,i)perylene	51	130	333	236	71	333	232	70	333	246	74
Benzo(k)fluoranthene	52	130	333	234	70	333	241	72	333	271	81
Chrysene	58	130	333	236	71	333	237	71	333	252	76
Dibenz(a,h)anthracene	55	130	333	237	71	333	235	71	333	246	74
Fluoranthene	62	130	333	230	69	333	236	71	333	253	76
Fluorene	58	130	333	213	64	333	235	71	333	248	74
Indeno(1,2,3-cd)pyrene	54	130	333	235	70	333	233	70	333	244	73
Naphthalene	41	130	333	173	52	333	189	57	333	189	57
Phenanthrene	60	130	333	220	66	333	229	69	333	246	74
Pyrene	51	130	333	230	69	333	232	70	333	246	74

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 147046			QC Batch: 147198			QC Batch: 147679		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	248	74	333	277	83	333	188	56
Acenaphthene	55	130	333	276	83	333	310	93	333	227	68
Acenaphthylene	55	130	333	270	81	333	299	90	333	218	65
Anthracene	66	130	333	305	92	333	344	103	333	291	87
Benzo(a)anthracene	55	130	333	273	82	333	298	89	333	239	72
Benzo(a)pyrene	56	130	333	305	92	333	338	102	333	299	90
Benzo(b)fluoranthene	53	130	333	318	95	333	330	99	333	260	78
Benzo(g,h,i)perylene	51	130	333	285	85	333	315	94	333	269	81
Benzo(k)fluoranthene	52	130	333	285	86	333	328	98	333	316	95
Chrysene	58	130	333	290	87	333	325	98	333	280	84
Dibenz(a,h)anthracene	55	130	333	282	85	333	315	95	333	270	81
Fluoranthene	62	130	333	286	86	333	320	96	333	272	82
Fluorene	58	130	333	279	84	333	311	93	333	239	72
Indeno(1,2,3-cd)pyrene	54	130	333	281	84	333	313	94	333	270	81
Naphthalene	41	130	333	220	66	333	256	77	333	185	55
Phenanthrene	60	130	333	276	83	333	307	92	333	248	75
Pyrene	51	130	333	286	86	333	315	95	333	264	79

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 3

Parameter	Rec Limits (%)		QC Batch: 147844			QC Batch: 148018			QC Batch: 148053		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	214	64	333	198	60	333	210	63
Acenaphthene	55	130	333	238	71	333	212	64	333	231	69
Acenaphthylene	55	130	333	232	70	333	206	62	333	223	67
Anthracene	66	130	333	266	80	333	227	68	333	248	74
Benzo(a)anthracene	55	130	333	215	64	333	198	60	333	223	67
Benzo(a)pyrene	56	130	333	252	76	333	212	63	333	245	73
Benzo(b)fluoranthene	53	130	333	239	72	333	216	65	333	240	72
Benzo(g,h,i)perylene	51	130	333	218	65	333	206	62	333	250	75
Benzo(k)fluoranthene	52	130	333	249	75	333	212	64	333	238	71
Chrysene	58	130	333	246	74	333	208	62	333	229	69
Dibenz(a,h)anthracene	55	130	333	225	68	333	204	61	333	251	75
Fluoranthene	62	130	333	241	72	333	207	62	333	232	70
Fluorene	58	130	333	235	71	333	209	63	333	230	69
Indeno(1,2,3-cd)pyrene	54	130	333	223	67	333	204	61	333	247	74
Naphthalene	41	130	333	202	61	333	195	59	333	189	57
Phenanthrene	60	130	333	229	69	333	206	62	333	230	69
Pyrene	51	130	333	235	71	333	209	63	333	228	68

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 4

Parameter	Rec Limits (%)		QC Batch: 148109			QC Batch: 148256			QC Batch: 148259		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	218	65	333	197	59	333	197	59
Acenaphthene	55	130	333	235	70	333	213	64	333	215	64
Acenaphthylene	55	130	333	228	68	333	207	62	333	210	63
Anthracene	66	130	333	255	77	333	232	70	333	234	70
Benzo(a)anthracene	55	130	333	230	69	333	208	63	333	212	64
Benzo(a)pyrene	56	130	333	246	74	333	228	69	333	229	69
Benzo(b)fluoranthene	53	130	333	268	80	333	224	67	333	222	67
Benzo(g,h,i)perylene	51	130	333	254	76	333	235	70	333	237	71
Benzo(k)fluoranthene	52	130	333	226	68	333	219	66	333	223	67
Chrysene	58	130	333	236	71	333	215	65	333	215	64
Dibenz(a,h)anthracene	55	130	333	255	76	333	237	71	333	240	72
Fluoranthene	62	130	333	238	72	333	216	65	333	217	65
Fluorene	58	130	333	234	70	333	212	64	333	213	64
Indeno(1,2,3-cd)pyrene	54	130	333	251	75	333	232	70	333	235	70
Naphthalene	41	130	333	210	63	333	191	57	333	186	56
Phenanthrene	60	130	333	234	70	333	214	64	333	214	64
Pyrene	51	130	333	234	70	333	211	63	333	215	65

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 5

Parameter	Rec Limits (%)		QC Batch: 148430			QC Batch: 148444			QC Batch: 148586		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	179	54	333	221	66	333	240	72
Acenaphthene	55	130	333	204	61	333	241	72	333	268	80
Acenaphthylene	55	130	333	197	59	333	234	70	333	256	77
Anthracene	66	130	333	232	69	333	261	78	333	295	89
Benzo(a)anthracene	55	130	333	208	63	333	233	70	333	269	81
Benzo(a)pyrene	56	130	333	278	83	333	295	89	333	299	90
Benzo(b)fluoranthene	53	130	333	277	83	333	306	92	333	327	98
Benzo(g,h,i)perylene	51	130	333	282	85	333	311	93	333	297	89
Benzo(k)fluoranthene	52	130	333	260	78	333	294	88	333	266	80
Chrysene	58	130	333	215	64	333	241	72	333	272	82
Dibenz(a,h)anthracene	55	130	333	286	86	333	316	95	333	309	93
Fluoranthene	62	130	333	216	65	333	241	72	333	278	83
Fluorene	58	130	333	207	62	333	238	71	333	272	82
Indeno(1,2,3-cd)pyrene	54	130	333	281	84	333	311	93	333	303	91
Naphthalene	41	130	333	163	49	333	207	62	333	218	66
Phenanthrene	60	130	333	212	64	333	239	72	333	273	82
Pyrene	51	130	333	212	63	333	239	72	333	269	81

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 6

Parameter	Rec Limits (%)		QC Batch: 148722			QC Batch: 148723			QC Batch: 149197		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	211	63	333	192	57	333	233	70
Acenaphthene	55	130	333	230	69	333	211	63	333	242	73
Acenaphthylene	55	130	333	223	67	333	202	61	333	234	70
Anthracene	66	130	333	250	75	333	248	74	333	270	81
Benzo(a)anthracene	55	130	333	225	68	333	225	67	333	229	69
Benzo(a)pyrene	56	130	333	251	75	333	245	74	333	266	80
Benzo(b)fluoranthene	53	130	333	261	78	333	257	77	333	259	78
Benzo(g,h,i)perylene	51	130	333	245	74	333	239	72	333	248	74
Benzo(k)fluoranthene	52	130	333	234	70	333	228	68	333	242	73
Chrysene	58	130	333	232	70	333	239	72	333	251	75
Dibenz(a,h)anthracene	55	130	333	253	76	333	253	76	333	260	78
Fluoranthene	62	130	333	232	70	333	234	70	333	249	75
Fluorene	58	130	333	229	69	333	215	65	333	238	71
Indeno(1,2,3-cd)pyrene	54	130	333	248	74	333	246	74	333	255	77
Naphthalene	41	130	333	199	60	333	169	51	333	219	66
Phenanthrene	60	130	333	232	69	333	225	68	333	241	72
Pyrene	51	130	333	231	69	333	231	69	333	240	72

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 7

Parameter	Rec Limits (%)		QC Batch: 149348			QC Batch: 149754			QC Batch: 149755		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	257	77	333	207	62	333	287	86
Acenaphthene	55	130	333	258	77	333	216	65	333	296	89
Acenaphthylene	55	130	333	254	76	333	209	63	333	288	86
Anthracene	66	130	333	276	83	333	231	69	333	326	98
Benzo(a)anthracene	55	130	333	251	75	333	210	63	333	281	84
Benzo(a)pyrene	56	130	333	275	83	333	226	68	333	321	96
Benzo(b)fluoranthene	53	130	333	295	89	333	236	71	333	309	93
Benzo(g,h,i)perylene	51	130	333	276	83	333	237	71	333	264	79
Benzo(k)fluoranthene	52	130	333	251	75	333	215	65	333	311	93
Chrysene	58	130	333	256	77	333	217	65	333	299	90
Dibenz(a,h)anthracene	55	130	333	288	86	333	236	71	333	298	89
Fluoranthene	62	130	333	257	77	333	217	65	333	303	91
Fluorene	58	130	333	256	77	333	214	64	333	296	89
Indeno(1,2,3-cd)pyrene	54	130	333	288	86	333	240	72	333	296	89
Naphthalene	41	130	333	232	70	333	185	56	333	257	77
Phenanthrene	60	130	333	255	76	333	212	64	333	293	88
Pyrene	51	130	333	258	77	333	215	64	333	299	90

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 8

Parameter	Rec Limits (%)		QC Batch: 150041			QC Batch: 150176			QC Batch: 150317		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	244	73	333	217	65	333	207	62
Acenaphthene	55	130	333	262	79	333	249	75	333	217	65
Acenaphthylene	55	130	333	254	76	333	237	71	333	210	63
Anthracene	66	130	333	287	86	333	283	85	333	237	71
Benzo(a)anthracene	55	130	333	255	77	333	237	71	333	211	63
Benzo(a)pyrene	56	130	333	270	81	333	277	83	333	221	66
Benzo(b)fluoranthene	53	130	333	297	89	333	243	73	333	236	71
Benzo(g,h,i)perylene	51	130	333	295	89	333	229	69	333	242	73
Benzo(k)fluoranthene	52	130	333	267	80	333	287	86	333	230	69
Chrysene	58	130	333	265	79	333	262	79	333	225	68
Dibenz(a,h)anthracene	55	130	333	297	89	333	233	70	333	240	72
Fluoranthene	62	130	333	269	81	333	259	78	333	219	66
Fluorene	58	130	333	264	79	333	251	75	333	217	65
Indeno(1,2,3-cd)pyrene	54	130	333	301	90	333	238	72	333	228	69
Naphthalene	41	130	333	207	62	333	185	55	333	194	58
Phenanthrene	60	130	333	262	79	333	248	74	333	212	64
Pyrene	51	130	333	263	79	333	253	76	333	217	65

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 9

Parameter	Rec Limits (%)		QC Batch: 150398		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	259	78
Acenaphthene	55	130	333	273	82
Acenaphthylene	55	130	333	265	79
Anthracene	66	130	333	302	91
Benzo(a)anthracene	55	130	333	255	77
Benzo(a)pyrene	56	130	333	301	90
Benzo(b)fluoranthene	53	130	333	267	80
Benzo(g,h,i)perylene	51	130	333	306	92
Benzo(k)fluoranthene	52	130	333	302	91
Chrysene	58	130	333	278	84
Dibenz(a,h)anthracene	55	130	333	304	91
Fluoranthene	62	130	333	278	83
Fluorene	58	130	333	270	81
Indeno(1,2,3-cd)pyrene	54	130	333	306	92
Naphthalene	41	130	333	232	70
Phenanthrene	60	130	333	268	80
Pyrene	51	130	333	264	79

Table 3-24. Water Method 8270-SIM LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 200-64113			QC Batch: 200-64273			QC Batch: 200-64903		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2-Methylnaphthalene	55	105	0.400	0.312	78	0.400	0.293	73	0.400	0.360	90
	55	105				0.400	0.367	92			
Acenaphthene	55	110	0.400	0.350	88	0.400	0.321	80	0.400	0.370	93
	55	110				0.400	0.354	88			
Acenaphthylene	55	110	0.400	0.374	93	0.400	0.321	80	0.400	0.361	90
	55	110				0.400	0.354	89			
Anthracene	55	110	0.400	0.312	78	0.400	0.330	83	0.400	0.358	89
	55	110				0.400	0.359	90			
Benzo[a]anthracene	55	120	0.400	0.461	115	0.400	0.332	83	0.400	0.365	91
	55	120				0.400	0.363	91			
Benzo[a]pyrene	50	120	0.400	0.365	91	0.400	0.332	83	0.400	0.352	88
	50	120				0.400	0.361	90			
Benzo[b]fluoranthene	45	120	0.400	0.504 ^ *	126	0.400	0.294 ^	73	0.400	0.341 ^	85
	45	120				0.400	0.345 ^	86			
Benzo[g,h,i]perylene	30	125	0.400	0.373	93	0.400	0.337	84	0.400	0.412	103
	30	125				0.400	0.342	86			
Benzo[k]fluoranthene	45	120	0.400	0.317	79	0.400	0.326	81	0.400	0.353	88
	45	120				0.400	0.339	85			
Chrysene	45	115	0.400	0.292	73	0.400	0.316	79	0.400	0.362	90
	45	115				0.400	0.340	85			
Dibenz(a,h)anthracene	30	130	0.400	0.421	105	0.400	0.344	86	0.400	0.388	97
	30	130				0.400	0.377	94			
Fluoranthene	45	120	0.400	0.356	89	0.400	0.346	86	0.400	0.363	91
	45	120				0.400	0.378	94			
Fluorene	55	110	0.400	0.375	94	0.400	0.329	82	0.400	0.368	92
	55	110				0.400	0.362	91			
Indeno[1,2,3-cd]pyrene	30	130	0.400	0.392	98	0.400	0.335	84	0.400	0.390	97
	30	130				0.400	0.350	88			
Naphthalene	50	105	0.400	0.333	83	0.400	0.310	78	0.400	0.367	92
	50	105				0.400	0.359	90			
Phenanthrene	50	110	0.400	0.379	95	0.400	0.312	78	0.400	0.364	91
	50	110				0.400	0.339	85			
Pyrene	50	115	0.400	0.332	83	0.400	0.279	70	0.400	0.372	93
	50	115				0.400	0.301	75			

Table 3-24. Water Method 8270-SIM LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 200-65095			QC Batch: 200-65550			QC Batch: 200-65764		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2-Methylnaphthalene	55	105	0.400	0.229	57	0.400	0.336	84	0.400	0.310	78
	55	105							0.400	0.284	71
Acenaphthene	55	110	0.400	0.238	59	0.400	0.349	87	0.400	0.315	79
	55	110							0.400	0.291	73
Acenaphthylene	55	110	0.400	0.252	63	0.400	0.382	96	0.400	0.344	86
	55	110							0.400	0.312	78
Anthracene	55	110	0.400	0.249	62	0.400	0.378	95	0.400	0.337	84
	55	110							0.400	0.322	81
Benzo[a]anthracene	55	120	0.400	0.262	65	0.400	0.387	97	0.400	0.341	85
	55	120							0.400	0.330	82
Benzo[a]pyrene	50	120	0.400	0.242	60	0.400	0.364	91	0.400	0.323	81
	50	120							0.400	0.312	78
Benzo[b]fluoranthene	45	120	0.400	0.243	61	0.400	0.347	87	0.400	0.310	78
	45	120							0.400	0.337	84
Benzo[g,h,i]perylene	30	125	0.400	0.253	63	0.400	0.384	96	0.400	0.359	90
	30	125							0.400	0.306	77
Benzo[k]fluoranthene	45	120	0.400	0.232	58	0.400	0.331	83	0.400	0.301	75
	45	120							0.400	0.315	79
Chrysene	45	115	0.400	0.235	59	0.400	0.344	86	0.400	0.304	76
	45	115							0.400	0.296	74
Dibenz(a,h)anthracene	30	130	0.400	0.249	62	0.400	0.382	95	0.400	0.343	86
	30	130							0.400	0.301	75
Fluoranthene	45	120	0.400	0.238	59	0.400	0.355	89	0.400	0.330	82
	45	120							0.400	0.325	81
Fluorene	55	110	0.400	0.243	61	0.400	0.360	90	0.400	0.323	81
	55	110							0.400	0.300	75
Indeno[1,2,3-cd]pyrene	30	130	0.400	0.242	60	0.400	0.372	93	0.400	0.344	86
	30	130							0.400	0.303	76
Naphthalene	50	105	0.400	0.237	59	0.400	0.342	85	0.400	0.319	80
	50	105							0.400	0.290	72
Phenanthrene	50	110	0.400	0.227	57	0.400	0.341	85	0.400	0.303	76
	50	110							0.400	0.296	74
Pyrene	50	115	0.400	0.220	55	0.400	0.316	79	0.400	0.258	65
	50	115							0.400	0.259	65

Table 3-24. Water Method 8270-SIM LCS Results Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 200-65973			QC Batch: 200-66593		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2-Methylnaphthalene	55	105	0.400	0.336	84	0.400	0.327	82
	55	105				0.400	0.336	84
Acenaphthene	55	110	0.400	0.330	83	0.400	0.355	89
	55	110				0.400	0.350	87
Acenaphthylene	55	110	0.400	0.354	88	0.400	0.351	88
	55	110				0.400	0.352	88
Anthracene	55	110	0.400	0.342	85	0.400	0.352	88
	55	110				0.400	0.346	87
Benzo[a]anthracene	55	120	0.400	0.373	93	0.400	0.399	100
	55	120				0.400	0.393	98
Benzo[a]pyrene	50	120	0.400	0.338	85	0.400	0.366	92
	50	120				0.400	0.361	90
Benzo[b]fluoranthene	45	120	0.400	0.342	86	0.400	0.368	92
	45	120				0.400	0.370	93
Benzo[g,h,i]perylene	30	125	0.400	0.355	89	0.400	0.371	93
	30	125				0.400	0.352	88
Benzo[k]fluoranthene	45	120	0.400	0.320	80	0.400	0.345	86
	45	120				0.400	0.348	87
Chrysene	45	115	0.400	0.331	83	0.400	0.354	89
	45	115				0.400	0.346	87
Dibenz(a,h)anthracene	30	130	0.400	0.310	77	0.400	0.388	97
	30	130				0.400	0.374	93
Fluoranthene	45	120	0.400	0.327	82	0.400	0.362	91
	45	120				0.400	0.339	85
Fluorene	55	110	0.400	0.337	84	0.400	0.360	90
	55	110				0.400	0.357	89
Indeno[1,2,3-cd]pyrene	30	130	0.400	0.330	82	0.400	0.387	97
	30	130				0.400	0.373	93
Naphthalene	50	105	0.400	0.344	86	0.400	0.342	86
	50	105				0.400	0.356	89
Phenanthrene	50	110	0.400	0.320	80	0.400	0.349	87
	50	110				0.400	0.337	84
Pyrene	50	115	0.400	0.326	81	0.400	0.345	86
	50	115				0.400	0.339	85

3.3.8 Field Duplicates

Field duplicates generally did not exhibit good agreement for most of analytes with RPD values >30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. Many samples exceeded 30% at more than twice the limit of quantitation therefore, these analytes for these samples and their duplicate only will be qualified as estimated ("J").

The results of the field duplicate analyses are given in Table 3-25.

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	942		181	303	J	527	102.7	427	M1	20.2	339		20.0	23.0
Acenaphthene	508		181	354	J	527	35.7	96		20.2	72.2		20.0	28.3
Acenaphthylene	244		181	264	U	527	NC	48.6		20.2	41.2		20.0	16.5
Anthracene	985		181	905		527	8.5	126		20.2	96.9		20.0	26.1
Benzo(a)anthracene	1920		181	2460		527	24.7	115		20.2	82.5		20.0	32.9
Benzo(a)pyrene	2080		181	3230		527	43.3	118		20.2	85.9		20.0	31.5
Benzo(b)fluoranthene	1910		181	3000		527	44.4	79.4		20.2	46.4		20.0	52.5
Benzo(g,h,i)perylene	1260		181	1910		527	41.0	46.6		20.2	33.8		20.0	31.8
Benzo(k)fluoranthene	2020		181	3040		527	40.3	76.3		20.2	56.5		20.0	29.8
Chrysene	2500		181	3150		527	23.0	135		20.2	93.3		20.0	36.5
Dibenz(a,h)anthracene	445		181	681		527	41.9	19.0	J	20.2	13.3	J	20.0	35.3
Fluoranthene	4970		181	6100		527	20.4	181	L2	20.2	122	L2	20.0	38.9
Fluorene	598		181	481	J	527	21.7	101		20.2	73.9		20.0	31.0
Indeno(1,2,3-cd)pyrene	1170		181	1780		527	41.4	43		20.2	28.4		20.0	40.9
Naphthalene	825		181	283	J	527	97.8	634	M1, R1	20.2	401		20.0	45.0
Phenanthrene	3790		181	4210		527	10.5	407	M1	20.2	305		20.0	28.7
Pyrene	4390		181	5040		527	13.8	244		20.2	179		20.0	30.7

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 1

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	96		19.6	361		152	116.0	22900		7910	36000		12800	44.5
Acenaphthene	28.3		19.6	144	J	152	134.3	18200		7910	32200		12800	55.6
Acenaphthylene	9.8	U	19.6	92.8	J	152	NC	3960	U	7910	6390	U	12800	0.0
Anthracene	27.9		19.6	341		152	169.7	4590	J	7910	7840	J	12800	52.3
Benzo(a)anthracene	25.3		19.6	699		152	186.0	3960	U	7910	6390	U	12800	0.0
Benzo(a)pyrene	21.6		19.6	688		152	187.8	1410	U	7910	3060	J	12800	NC
Benzo(b)fluoranthene	14.0	J	19.6	738		152	192.6	3960	U	7910	6390	U	12800	0.0
Benzo(g,h,i)perylene	10.8	J	19.6	462		152	190.9	3960	U	7910	6390	U	12800	0.0
Benzo(k)fluoranthene	15.3	J	19.6	693		152	191.4	1390	U	7910	2250	U	12800	0.0
Chrysene	32.1		19.6	937		152	186.8	3960	U	7910	6390	U	12800	0.0
Dibenz(a,h)anthracene	9.8	U	19.6	170		152	NC	3960	U	7910	6390	U	12800	0.0
Fluoranthene	45.5		19.6	1620		152	189.1	3960	U	7910	8080	J	12800	NC
Fluorene	20		19.6	217		152	166.2	4850	J	7910	8350	J	12800	53.0
Indeno(1,2,3-cd)pyrene	9.8	U	19.6	403		152	NC	3960	U	7910	6390	U	12800	0.0
Naphthalene	113		19.6	394		152	110.8	148000		7910	205000		12800	32.3
Phenanthrene	97.4		19.6	1220		152	170.4	12700		7910	22200		12800	54.4
Pyrene	56		19.6	1560		152	186.1	5410	J	7910	11000	J	12800	68.1

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 2

Parameter	Sample ID: 111313084			Sample ID: 111313095			RPD	Sample ID: 111513201			Sample ID: 111513208			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	1940		173	236		34.8	<i>156.6</i>	716		171	207		42.5	<i>110.3</i>
Acenaphthene	773		173	100		34.8	<i>154.2</i>	238		171	81.1		42.5	<i>98.3</i>
Acenaphthylene	256		173	32.0	J	34.8	<i>155.6</i>	118	J	171	38.8	J	42.5	<i>101.0</i>
Anthracene	1220		173	126		34.8	<i>162.6</i>	420		171	154		42.5	<i>92.7</i>
Benzo(a)anthracene	1370		173	190		34.8	<i>151.3</i>	976		171	315		42.5	<i>102.4</i>
Benzo(a)pyrene	1190		173	184		34.8	<i>146.4</i>	1310		171	426		42.5	<i>101.8</i>
Benzo(b)fluoranthene	1070		173	226		34.8	<i>130.2</i>	1560		171	468		42.5	<i>107.7</i>
Benzo(g,h,i)perylene	720		173	137		34.8	<i>136.1</i>	681		171	234		42.5	<i>97.7</i>
Benzo(k)fluoranthene	1260		173	156		34.8	<i>155.9</i>	1290		171	407		42.5	<i>104.1</i>
Chrysene	1820		173	270		34.8	<i>148.3</i>	1410		171	431		42.5	<i>106.4</i>
Dibenz(a,h)anthracene	249		173	39.2		34.8	<i>145.6</i>	243		171	83.8		42.5	<i>97.4</i>
Fluoranthene	3260		173	491		34.8	<i>147.6</i>	2560		171	794		42.5	<i>105.3</i>
Fluorene	910		173	99.7		34.8	<i>160.5</i>	301		171	96		42.5	<i>103.3</i>
Indeno(1,2,3-cd)pyrene	617		173	97.4		34.8	<i>145.5</i>	636		171	208		42.5	<i>101.4</i>
Naphthalene	702		173	83.3		34.8	<i>157.6</i>	303		171	86.1		42.5	<i>111.5</i>
Phenanthrene	3800		173	497		34.8	<i>153.7</i>	2000		171	641		42.5	<i>102.9</i>
Pyrene	3670		173	545		34.8	<i>148.3</i>	2780		171	830		42.5	<i>108.0</i>

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 3

Parameter	Sample ID: 111813251			Sample ID: 111813258			RPD	Sample ID: 112213444			Sample ID: 112213446			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	20700		1100	27200		1330	27.1	31.2		19.4	15.5	J	19.3	67.2
Acenaphthene	9010		1100	10900		1330	19.0	13.8	J	19.4	9.7	U	19.3	NC
Acenaphthylene	1800		1100	1770		1330	1.7	9.7	U	19.4	9.7	U	19.3	0.0
Anthracene	6680		1100	7340		1330	9.4	10.4	J	19.4	9.7	U	19.3	NC
Benzo(a)anthracene	4470		1100	4650		1330	3.9	9.7	U	19.4	9.7	U	19.3	0.0
Benzo(a)pyrene	4710		1100	4790		1330	1.7	7.0	J	19.4	3.4	U	19.3	NC
Benzo(b)fluoranthene	3000		1100	2800		1330	6.9	9.7	U	19.4	9.7	U	19.3	0.0
Benzo(g,h,i)perylene	2140		1100	2200		1330	2.8	9.7	U	19.4	9.7	U	19.3	0.0
Benzo(k)fluoranthene	2580		1100	2900		1330	11.7	3.8	J	19.4	3.4	U	19.3	NC
Chrysene	4870		1100	5220		1330	6.9	10.8	J	19.4	9.7	U	19.3	NC
Dibenz(a,h)anthracene	660	J	1100	709	J	1330	7.2	9.7	U	19.4	9.7	U	19.3	0.0
Fluoranthene	7650		1100	8430		1330	9.7	13.6	J	19.4	9.7	U	19.3	NC
Fluorene	4930		1100	5850		1330	17.1	9.7	U	19.4	9.7	U	19.3	0.0
Indeno(1,2,3-cd)pyrene	1640		1100	1680		1330	2.4	9.7	U	19.4	9.7	U	19.3	0.0
Naphthalene	20800		1100	10600		1330	65.0	94.0		19.4	43.2		19.3	74.1
Phenanthrene	17900		1100	20600		1330	14.0	48.4		19.4	24.3		19.3	66.3
Pyrene	11200		1100	12000		1330	6.9	17.2	J	19.4	9.7	U	19.3	NC

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 4

Parameter	Sample ID: 112613504			Sample ID: 112613517			RPD	Sample ID: 120213557			Sample ID: 120213570			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	4380		267	47300		5380	<i>166.1</i>	73900		13800	87400		14000	16.7
Acenaphthene	1220		267	18200		5380	<i>174.9</i>	26300		13800	30500		14000	14.8
Acenaphthylene	561		267	2910	J	5380	<i>135.4</i>	6890	U	13800	6980	U	14000	0.0
Anthracene	1080		267	9340		5380	<i>158.5</i>	13200	J	13800	14300		14000	8.0
Benzo(a)anthracene	1100		267	4980	J	5380	<i>127.6</i>	6890	U	13800	8060	J	14000	NC
Benzo(a)pyrene	1250		267	5480		5380	<i>125.7</i>	6050	J	13800	6360	J	14000	5.0
Benzo(b)fluoranthene	808	1q	267	3960	J1q	5380	<i>132.2</i>	6890	U	13800	6980	U	14000	0.0
Benzo(g,h,i)perylene	661		267	3220	J	5380	<i>131.9</i>	6890	U	13800	6980	U	14000	0.0
Benzo(k)fluoranthene	906	1q	267	1690	J1q	5380	<i>60.4</i>	3670	J	13800	3780	J	14000	3.0
Chrysene	1320		267	5440		5380	<i>121.9</i>	8840	J	13800	10600	J	14000	18.1
Dibenz(a,h)anthracene	206	J	267	2690	U	5380	NC	6890	U	13800	6980	U	14000	0.0
Fluoranthene	1920		267	8810		5380	<i>128.4</i>	13800	J	13800	15400		14000	11.0
Fluorene	895		267	9300		5380	<i>164.9</i>	12100	J	13800	15000		14000	21.4
Indeno(1,2,3-cd)pyrene	483		267	2690	U	5380	NC	6890	U	13800	6980	U	14000	0.0
Naphthalene	1370		267	74700		5380	<i>192.8</i>	163000		13800	187000		14000	13.7
Phenanthrene	3360		267	27800		5380	<i>156.9</i>	39400		13800	46200		14000	15.9
Pyrene	2540		267	13800		5380	<i>137.8</i>	20300		13800	24300		14000	17.9

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 5

Parameter	Sample ID: 111113038			Sample ID: 111113041			RPD	Sample ID: 111913305			Sample ID: 111913307			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	10.4	U	20.8	12.2	J	20.9	NC	542	M1	25.7	134		24.0	120.7
Acenaphthene	22.6		20.8	17.7	J	20.9	24.3	179		25.7	51.3		24.0	110.9
Acenaphthylene	10.4	U	20.8	10.4	U	20.9	0.0	14.6	J	25.7	12.0	U	24.0	NC
Anthracene	34.5		20.8	15.3	J	20.9	77.1	109		25.7	54.3		24.0	67.0
Benzo(a)anthracene	77.4		20.8	49.3		20.9	44.4	39.5		25.7	23.0	J	24.0	52.8
Benzo(a)pyrene	81.7		20.8	59.3		20.9	31.8	33.2		25.7	15.4	J	24.0	73.3
Benzo(b)fluoranthene	90.4		20.8	44.3		20.9	68.4	26.1		25.7	12.0	U	24.0	NC
Benzo(g,h,i)perylene	44.9		20.8	34.2		20.9	27.1	16.9	J	25.7	12.0	U	24.0	NC
Benzo(k)fluoranthene	74.2		20.8	61		20.9	19.5	15.4	J	25.7	9.3	J	24.0	49.4
Chrysene	114		20.8	67.3		20.9	51.5	45		25.7	26.4		24.0	52.1
Dibenz(a,h)anthracene	15.5	J	20.8	10.4	U	20.9	NC	12.9	U	25.7	12.0	U	24.0	0.0
Fluoranthene	252		20.8	95.5		20.9	90.1	97		25.7	63.7		24.0	41.4
Fluorene	20.1	J	20.8	10.4	U	20.9	NC	100		25.7	33		24.0	100.8
Indeno(1,2,3-cd)pyrene	36.6		20.8	26.6		20.9	31.6	12.9	U	25.7	12.0	U	24.0	0.0
Naphthalene	10.4	U	20.8	10.4	U	20.9	0.0	493	M1	25.7	149		24.0	107.2
Phenanthrene	193		20.8	53.8		20.9	112.8	336		25.7	160		24.0	71.0
Pyrene	196		20.8	93.7		20.9	70.6	120		25.7	82.8		24.0	36.7

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 6

Parameter	Sample ID: 112013358			Sample ID: 112013364			RPD	Sample ID: 120413619			Sample ID: 120413632			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	270	M1, R1	106	357		106	27.8	106		84.6	43.0	J	84.7	84.6
Acenaphthene	52.9	U	106	96.7	J	106	NC	144		84.6	64.7	J	84.7	76.0
Acenaphthylene	52.9	U	106	53.0	U	106	0.0	85.9		84.6	43.4	J	84.7	65.7
Anthracene	52.9	U	106	53.0	U	106	0.0	353		84.6	138		84.7	87.6
Benzo(a)anthracene	52.9	U	106	53.0	U	106	0.0	918		84.6	378		84.7	83.3
Benzo(a)pyrene	18.8	U	106	36.3	J	106	NC	1110		84.6	453		84.7	84.1
Benzo(b)fluoranthene	52.9	U1q	106	53.0	U1q	106	0.0	1050		84.6	500		84.7	71.0
Benzo(g,h,i)perylene	52.9	U	106	53.0	U	106	0.0	743		84.6	353		84.7	71.2
Benzo(k)fluoranthene	18.6	U1q	106	18.7	U1q	106	NC	1040		84.6	328		84.7	104.1
Chrysene	52.9	U	106	53.0	U	106	0.0	1230	M1	84.6	556		84.7	75.5
Dibenz(a,h)anthracene	52.9	U	106	53.0	U	106	0.0	227		84.6	94.5		84.7	82.4
Fluoranthene	52.9	U	106	63.8	J	106	NC	2340	M1	84.6	1040		84.7	76.9
Fluorene	52.9	U	106	53.0	U	106	0.0	175		84.6	75.4	J	84.7	79.6
Indeno(1,2,3-cd)pyrene	52.9	U	106	53.0	U	106	0.0	627		84.6	253		84.7	85.0
Naphthalene	2350	M1, R1	106	2110		106	10.8	101		84.6	54.6	J	84.7	59.6
Phenanthrene	52.9	U	106	159		106	NC	1470	M1	84.6	599		84.7	84.2
Pyrene	52.9	U	106	95.1	J	106	NC	2190	M1	84.6	937		84.7	80.1

3.4 SW-846 Method 8082A, Polychlorinated Biphenyls (PCBs)

3.4.1 Summary

Sediment samples were analyzed for polychlorinated biphenyls (PCBs) using SW-846 Method 8082A. Method 8082A employs gas chromatographic separation with a halogen specific electron capture detector. Identification is accomplished by comparing retention times and elution patterns to known standards and confirmed by analysis on a second gas chromatographic column of dissimilar phase.

Due to an error at sample log-in, PCB analysis was requested for SDG 4088486, but samples were not logged or immediately analyzed by the laboratory. Analyses were subsequently performed well after (i.e., months) sample receipt. However, neither the National Functional Guidelines nor the Multi-site QAPP establish technical holding times for PCBs in a soil/solid matrix. In addition, the holding time for PCBs in all matrices has been re-established by EPA to be "none" as defined in SW-846, Chapter 4. Hence, no action is taken to qualify data based upon the delayed extraction and analysis for PCBs.

The results of the QC review are presented below.

3.4.2 Sample Receipt

All samples were received by the laboratory in good condition, cold ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) and intact. All samples were prepared and analyzed within the prescribed holding times.

3.4.3 Method Blanks

A laboratory method blank was prepared and analyzed for each analytical batch. The sediment method blank consisted of an aliquot of sodium sulfate extracted as a sample. None of the method blanks associated with these sample analyses showed any contamination for any of the target compounds above the detection limit. Hence, no data are qualified due to method blank contamination.

In addition to the method blanks, equipment blanks were also submitted and analyzed. None of the blanks showed any contamination for any other the PCB mixtures. No data are qualified as a consequence of the equipment blank results.

The method blank results are summarized in Tables 3-26 and 3-27.

Table 3-26. Sediment Method 8082 Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 145766	QC Batch: 146001	QC Batch: 146479	QC Batch: 146485	QC Batch: 146625	QC Batch: 149951	QC Batch: 154823
PCB-1016 (Aroclor 1016)	25.0 U						
PCB-1221 (Aroclor 1221)	25.0 U						
PCB-1232 (Aroclor 1232)	25.0 U						
PCB-1242 (Aroclor 1242)	25.0 U						
PCB-1248 (Aroclor 1248)	25.0 U						
PCB-1254 (Aroclor 1254)	25.0 U						
PCB-1260 (Aroclor 1260)	25.0 U						

Table 3-27. Water Method 8082 Method Blank Results Summary (µg/L)

Parameter	QC Batch: 200-64235	QC Batch: 200-64283	QC Batch: 200-64627	QC Batch: 200-64648	QC Batch: 200-66529
PCB-1016	0.031 U				
PCB-1221	0.041 U				
PCB-1232	0.065 U				
PCB-1242	0.037 U				
PCB-1248	0.034 U				
PCB-1254	0.044 U				
PCB-1260	0.030 U				
PCB-1262	0.044 U				
PCB-1268	0.020 U				

3.4.4 Calibration

All initial calibration acceptance criteria were met for all of the analytes. Multiple calibration verifications (CCVs) were performed in the course of these analyses.

All of the CCV results associated with these analyses gave passing results (i.e., <25% D) using CLP NFG for PCBs. Hence, no data are qualified as consequence of the PCB calibration data.

3.4.5 Surrogate Compound Recoveries

Two surrogates, tetrachloro-*m*-xylene (TCMX) and decachlorobiphenyl (DCB) were spiked into each field sample to monitor method recovery. Use of these two compounds as surrogates is consistent with the SW-846 guidance.

Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. Most failed samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Samples 102813265, 102913299, 102913300, 102913301, 110113386, 110113389, 110113395, 110113406, and 110513474 with little or no dilution had a recovery below the lower limit. Since the failed recovery is not attributable to dilution, positive results for this sample are qualified as estimated ("J"), non-detects will be qualified with a ("UJ").

The surrogate recoveries for all sample analyses are presented in Table 3-28 and 3-29.

Table 3-28. Sediment Method 8082 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Dilution	Decachloro-biphenyl		Tetrachloro- <i>m</i> -xylene	
			Limits:	48	130	40
4087646001	102813264	3	51		63	
4087646002	102813265	3	46	50	56	
4087646003	102813266	4	48		62	
4087646004	102813273	5	50		56	
4087646005	102813277	1	65		66	
4087646006	102813281	4	57		69	
4087646007	102813282	5	55		61	
4087646008	102813283	4	53		62	
4087646009	102813284	4	56		64	
4087646010	102813287	1	65		71	
4087646011	102813288	1	64		69	
4087646012	102913291	3	59		71	
4087646013	102913292	1	52		66	
4087646014	102913293	4	63		69	
4087646015	102913299	1	47	50	55	
4087646016	102913300	1	46	50	54	
4087646017	102913301	1	46	50	57	
4087646018	102913306	1	54		63	
4087646019	102913308	3	53		69	

Lab Sample Number	Field ID	Dilution	Decachloro-biphenyl		Tetrachloro-m-xylene	
4087646020	102913309	2	51		65	
4087646021	102913310	3	82		75	
4087646022	102913313	1	79		76	
4087646023	102913317	1	81		77	
4087646024	102913325	1	83		80	
4087646025	102913327	10	87		77	
4087646026	102913328	20	0	S4	0	S4
4087646027	102913329	10	74		61	
4087646028	102913338	3	80		73	
4087646029	102913343	1	89		84	
4087646030	102913348	1	93		88	
4087646031	102913349	10	82		69	
4087646032	102913350	5	78		68	
4087646033	102913351	5	80		70	
4087646034	102913355	1	71		73	
4087646035	102913361	1	91		85	
4088053001	110113375	50	0	S4	0	S4
4088053002	110113376	100	0	S4	0	S4
4088053003	110113377	50	0	S4	0	S4
4088053004	110113380	100	0	S4	0	S4
4088053005	110113386	1	39	S0	53	
4088053006	110113389	1	35	S0	48	
4088053007	110113390	1	49		58	
4088053008	110113392	100	0	S4	0	S4
4088053009	110113393	10	65		68	
4088053010	110113394	4	56		64	
4088053011	110113395	2	45	S0	52	
4088053012	110113399	1	49		53	
4088053013	110113406	1	42	S0	53	
4088053014	110113408	1	52		62	
4088053015	110113410	5	73		68	
4088053016	110113411	4	75		73	
4088053017	110113412	4	77		72	
4088053018	110113424	1	73		77	
4088053019	110113429	1	76		73	
4088053020	110413432	2	75		74	
4088053021	110413433	2	77		75	
4088053022	110413434	50	0	S4	0	S4
4088053023	110413441	1	73		76	

Lab Sample Number	Field ID	Dilution	Decachloro-biphenyl		Tetrachloro-m-xylene	
4088053024	110413443	1	77		74	
4088053025	110413448	100	0	S4	0	S4
4088053026	110413449	30	0	S4	0	S4
4088053027	110413450	50	0	S4	0	S4
4088053028	110413457	1	73		78	
4088053029	110413458	1	78		77	
4088053030	110413460	1	73		78	
4088053031	110413461	4	73		70	
4088053032	110413462	20	0	S4	0	S4
4088053033	110413463	1	88		86	
4088053034	110413466	1	91		90	
4088053035	110413470	1	85		85	
4088053036	110413471	1	86		83	
4088486001	110813504	5	69		78	
4088486002	110813505	5	68		72	
4088486003	110813506	5	58		68	
4088486004	110813510	5	64		67	
4088486005	110813515	1	55		68	
4088486006	110813517	1	62		70	
4088486007	110813518	1	67		70	

Table 3-29. Water Method 8082 Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	Decachloro-biphenyl		Tetrachloro-m-xylene	
			Limits:	30	150	55
200-19227-36	102813262	1	65		90	
			69		93	
200-19227-38	102913290	1	57		90	
			63		90	
200-19267-1	103013363	1	50		90	
			50		91	
200-19364-1	110113373	1	50		74	
			51		75	
200-19364-3	110413431	1	44		80	
			45		83	
200-19364-4	110513474	1	22	X	81	
			23	X	85	
200-19434-1	110713490	1	47		90	
			49		98	
200-19557-1	110813502	1	61		98	
			63		106	
200-20035-1	120613843	1	50		87	
			51		89	

3.4.6 Matrix Spike / Matrix Spike Duplicate

Matrix spike/matrix spiked duplicate (MS/MSD) analyses were performed on multiple samples. One of the PCB-1260 spikes for the MS/MSD analyses samples recovered outside the limits used by the laboratory due to being diluted by 100x. The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data alone. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The MS/MSD recoveries for all sample analyses are presented in Table 3-30.

Table 3-30. Sediment Method 8082 MS/MSD Results Summary

<i>Sample ID</i>	<i>Parameter</i>	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
102813277	PCB-1260	585	380	65	585	353	60	7	29.2 U	31
102913343	PCB-1260	605	536	89	605	548	90	2	30.3 U	31
110113376	PCB-1260	1180	5880 U	0	1180	0	0		5880 UM6	31
110413458	PCB-1260	569	481	85	569	468	82	3	28.4 U	31

3.4.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed for each analytical batch. None of the recoveries exceeded the laboratory's control limits for any of the PCB mixtures; hence there is no need for any further qualification of the data.

The laboratory control sample results are presented in Table 3-31 and 3-32.

Table 3-31. Sediment Method 8082 LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 145766			QC Batch: 146001			QC Batch: 146479		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
PCB-1260	70	130	500	418	84	500	488	98	500	430	86

Table 3-31. Sediment Method 8082 LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 146485			QC Batch: 146625			QC Batch: 149951			QC Batch: 154823		
	Lower	Upper	Spike (ug/kg)	Result (ug/kg)	Rec (%)	Spike (ug/kg)	Result (ug/kg)	Rec (%)	Spike (ug/kg)	Result (ug/kg)	Rec (%)	Spike (ug/kg)	Result (ug/kg)	Rec (%)
PCB-1260 (Aroclor 1260)	70	130	500	435	87	500	467	93	500	384	77	500	380	76

Table 3-32. Water Method 8082 LCS Summary

Parameter	Rec Limits (%)		QC Batch: 200-63929			QC Batch: 200-64235			QC Batch: 200-64283		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
PCB-1016	55	120	5.00	4.52	90	5.00	4.43	89	5.00	5.36	107
PCB-1260	60	125	5.00	4.21	84	5.00	4.32	86	5.00	5.47	109

Table 3-32. Water Method 8082 LCS Summary Cont.

Parameter	Rec Limits (%)		QC Batch: 200-64627			QC Batch: 200-64648			QC Batch: 200-66529		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
PCB-1016	55	120	5.00	4.17	83	5.00	4.22	84	5.00	4.45	89
PCB-1260	60	125	5.00	4.06	81	5.00	3.57	71	5.00	3.69	74

3.4.8 Field Duplicates

Field duplicates generally exhibited good agreement for most of analytes with RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. A few samples exceeded 30%RPD at more than twice the limit of quantitation. Therefore, these analytes for these samples and their duplicate only will be qualified as estimated ("J").

The results of the duplicate analyses are given in Table 3-33.

Table 3-33. Sediment Method 8082 Field Duplicate Results

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
PCB, Total	2520		325	2530		396	0.4	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1016 (Aroclor 1016)	163	U	325	198	U	396	0.0	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1221 (Aroclor 1221)	163	U	325	198	U	396	0.0	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1232 (Aroclor 1232)	163	U	325	198	U	396	0.0	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1242 (Aroclor 1242)	1450		325	1590		396	9.2	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1248 (Aroclor 1248)	163	U	325	198	U	396	0.0	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1254 (Aroclor 1254)	752		325	710		396	5.7	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1260 (Aroclor 1260)	319	J	325	228	J	396	33.3	30.3	U	60.5	30.0	U	60.0	0.0

Table 3-33. Sediment Method 8082 Field Duplicate Results Cont

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
PCB, Total	29.5	U	58.9	34000		11400	NC	297		95.0	716		95.9	82.7
PCB-1016 (Aroclor 1016)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1221 (Aroclor 1221)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1232 (Aroclor 1232)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1242 (Aroclor 1242)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1248 (Aroclor 1248)	29.5	U	58.9	34000		11400	NC	297		95.0	716		95.9	82.7
PCB-1254 (Aroclor 1254)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1260 (Aroclor 1260)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0

3.5 Alkylated PAHs

3.5.1 Summary

Analysis for alkylated PAHs was performed using a method developed by the analytical laboratory. The method employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM). Results are reported as compound classes (e.g., "C2-Fluorenes") rather than specific alkylated moieties. The lab is not accredited under NELAP for the following parameters; 2-Methylnaphthalene, Benzo(a,b)fluoranthene, Benzo(e)pyrene, C1-Chrysenes, C1-Fluoranthenes/Pyrenes, C1-Fluorenes, C1-Naphthalenes, C1-Phenanthrenes/Anthracenes, C2-Chrysenes, C2-Fluorenes, C2-Naphthalenes, C2-Phenanthrenes/Anthracenes, C3-Chrysenes, C3-Fluorenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Chrysenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes, Naphthalene and, Perylene.

Samples 112613490, 112613503 and, 112013331 were extracted outside of holding time and therefore will be qualified with all positive results as estimated ("J"), and non-detect results as estimated ("UJ").

3.5.2 Method Blanks

The samples were prepared in a multiple preparation batches. None of the target compounds for this method gave a positive result. Therefore, no data are qualified due to method blank contamination.

The results for the method blanks are summarized in Table 3-34.

Table 3-34. Sediment Alkylated PAH by SIM Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 276509	QC Batch: 277680	QC Batch: 278046	QC Batch: 278384	QC Batch: 279425	QC Batch: 279577	QC Batch: 280237	QC Batch: 280539	QC Batch: 281203	QC Batch: 282377
2-Methylnaphthalene	0.48 U									
Acenaphthene	0.40 U									
Acenaphthylene	0.42 U									
Anthracene	0.47 U									
Benzo(a)anthracene	0.48 U									
Benzo(a)pyrene	0.49 U									
Benzo(a,b)fluoranthene	0.65 U									
Benzo(e)pyrene	0.49 U									
Benzo(g,h,i)perylene	0.48 U									
Benzo(k)fluoranthene	0.53 U									
C1-Chrysenes	5.0 U									
C1-Fluoranthenes/Pyrenes	5.0 U									
C1-Fluorenes	5.0 U									
C1-Naphthalenes	5.0 U									
C1-Phenanthrenes/Anthracenes	5.0 U									
C2-Chrysenes	5.0 U									
C2-Fluorenes	5.0 U									
C2-Naphthalenes	5.0 U									
C2-Phenanthrenes/Anthracenes	5.0 U									
C3-Chrysenes	5.0 U									
C3-Fluorenes	5.0 U									
C3-Naphthalenes	5.0 U									
C3-Phenanthrenes/Anthracenes	5.0 U									
C4-Chrysenes	5.0 U									
C4-Naphthalenes	5.0 U									
C4-Phenanthrenes/Anthracenes	5.0 U									
Chrysene	0.50 U									
Dibenz(a,h)anthracene	0.52 U									
Fluoranthene	0.55 U									
Fluorene	0.40 U									
Indeno(1,2,3-cd)pyrene	0.53 U									
Naphthalene	0.43 U									
Perylene	2.0 U									
Phenanthrene	0.44 U									
Pyrene	0.56 U									

3.5.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for the alkylated PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes.

3.5.4 Surrogate Compound Recoveries

Three surrogates, 2-fluorobiphenyl, nitrobenzene-*d*₅, and terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., alkylated PAHs), the surrogates reported should be adequate to monitor recovery in the analyses. Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. A few samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Using the guidance from the October 1999 National Functional Guidelines (since the current NFG do not effectively address surrogate compounds), only sample results where at least two surrogate compounds from each fraction (i.e., base/neutral fraction or acid fraction) fail to recover within limits are cause for qualification. Sample 112013327 recovered above the upper limit for two compounds, therefore detected target compounds will be qualified as estimated ("J").

The surrogate recoveries for all samples are presented in Table 3-35.

Table 3-35. Sediment Alkylated PAH by SIM Surrogate Results Summary

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Nitrobenzene- <i>d</i> ₅		Terphenyl- <i>d</i> ₁₄	
			Limits:	59	125	30	125	63
4087646001	102813264	1	63		68		70	
4087646007	102813282	1	80		85		85	
4087646012	102913291	1	69		69		74	
4087646016	102913300	1	81		87		88	
4087646019	102913308	1	74		76		80	
4087646023	102913317	1	87		96		95	
4087646025	102913327	1	80		89		97	
4087646031	102913349	1	82		90		91	
4088053001	110113375	1	67		73		70	
4088053005	110113386	1	59		67		62	S0
4088053009	110113393	1	62		69		65	
4088053015	110113410	1	62		68		70	
4088053020	110413432	1	58	S0	70		70	
4088053025	110413448	1	58	S0	70		64	
4088053031	110413461	1	55	S0	69		66	
4088053035	110413470	1	58	S0	62		67	
4088482001	110813001	1	60		65		63	
4088482005	110813019	1	58	S0	63		64	
4088482008	111113024	1	62		66		70	
4088482015	111213043	1	61		67		67	
4088486001	110813504	10	0	S4	0	S4	0	S4
4088486005	110813515	1	59		57		65	
4088622001	111313070	1	59		65		67	
4088622005	111313085	1	60		65		65	
4088622009	111313096	1	69		78		76	
4088622014	111413118	1	61		66		70	
4088622019	111413139	1	59		66		68	
4088622023	111413154	1	61		71		72	
4088879001	111513159	1	63		63		68	
4088879006	111513182	1	56	S0	85		85	
4088879009	111513187	1	62		98		73	
4088879013	111513199	1	65		77		70	
4088879016	111813210	1	67		82		84	
4088879021	111813223	1	67		76		91	
4088879024	111813235	1	58	S0	61		116	
4088879027	111813239	1	63		77		96	
4088879033	111913260	1	63		68		79	

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Nitrobenzene- d_5		Terphenyl- d_{14}	
4088879038	111913279	1	64		81		81	
4088879043	111913298	1	63		64		84	
4089023001	112013310	1	61		64		77	
4089023005	112013327	1	65		246	S5	152	S5
4089023007	112013331	1	65		69		70	
4089023013	112013346	5	62		68		70	
4089023018	112113366	5	65		88		73	
4089023024	112113385	5	67		66		75	
4089202001	112213406	1	64		55		71	
4089202007	112213425	1	67		54		74	
4089202013	112213447	1	68		56		70	
4089202017	112513452	1	67		60		71	
4089202020	112513466	10	71		82		77	
4089202024	112513473	1	64		56		67	
4089362001	112613490	1	66		56		68	
4089362004	112613503	1	68		87		76	
4089509001	120213522	1	64		57		69	
4089509006	120213545	1	58	S0	49		63	
4089509011	120213559	1	59		77		80	
4089509014	120313572	1	59		49		63	
4089509019	120313588	1	60		55		67	
4089509023	120313603	1	59		69		71	
4089665001	120413617	1	60		52		65	
4089665007	120413633	1	63		62		69	
4089665012	120413645	1	65		63		104	
4089818001	120613845	1	61		79		73	
4090340001	120613862	1	59		68		69	
4090340002	120913865	1	62		60		68	
4090340003	120913866	1	63		64		71	
4090340004	120913662	50	0	S4	0	S4	0	S4
4090340005	120913663	1	69		171	S0	93	
4090340006	120913664	1	58	S0	72		81	
4090340007	121013868	1	56	S0	46		65	
4090340008	121013869	1	75		69		101	
4090340009	121013519	1	90		93		120	
4090340010	121013520	1	56	S0	74		84	
4090340011	121113521	1	57	S0	44		68	
4090340012	121113522	1	60		70		71	
4090340013	121113523	1	56	S0	45		68	

3.5.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on multiple samples.

Most of the analytes gave failing recoveries for the matrix spiked sample and/or the matrix spiked duplicate sample. Consequently, many of the RPD values exceeded the laboratory limits for the reported analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data. Most failures are attributed to samples dilution. No results will be qualified based on MS/MSD recovery.

The matrix spike/matrix spike duplicate results are summarized in Table 3-36.

3.5.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples.

All of the analytes for all of the laboratory control samples recovered within the limits used by the laboratory. No data are qualified based upon laboratory control sample results. The laboratory control sample results are given in Table 3-37.

3.5.7 Field Duplicates

No project specific field duplicates were analyzed with this data set.

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 102813264

Parameter	MS Sample ID: 102813264			MSD Sample ID: 102813264			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	74.3	344	143	74.3	404	223	16	238 M1, N2	30
Acenaphthene	74.3	805	449	74.3	972	672	19	472 M1	30
Acenaphthylene	74.3	651	74	74.3	530	-88	21	595 M1	30
Anthracene	74.3	1990	684	74.3	2410	1240	19	1480 M1	30
Benzo(a)anthracene	74.3	4240	1330	74.3	4730	1990	11	3250 M1	30
Benzo(a)pyrene	74.3	4490	1390	74.3	4570	1500	2	3460 M1	30
Benzo(a,b)fluoranthene	89.3	4550	1460	89.3	5010	1970	10	3250 M1, N2	30
Benzo(e)pyrene	74.3	3030	928	74.3	3070	982	1	2340 M1, N2	30
Benzo(g,h,i)perylene	74.3	2460	843	74.3	2250	565	9	1830 M1	30
Benzo(k)fluoranthene	74.3	3720	1570	74.3	3600	1420	3	2550 M1	30
Chrysene	74.3	4990	845	74.3	5420	1430	8	4360 M1	30
Dibenz(a,h)anthracene	74.3	725	213	74.3	745	240	3	566 M1	30
Fluoranthene	74.3	12200	4400	74.3	13300	5920	9	8890 M1	30
Fluorene	74.3	974	485	74.3	1150	725	17	613 M1	30
Indeno(1,2,3-cd)pyrene	74.3	2540	892	74.3	2390	685	6	1880 M1	30
Naphthalene	74.3	382	194	74.3	475	319	22	238 M1, N2	30
Perylene	74.3	1230	472	74.3	1230	462	0.6	883 M1, N2	30
Phenanthrene	74.3	8250	3740	74.3	9960	6030	19	5470 M1	30
Pyrene	74.3	8350	1700	74.3	9310	3000	11	7080 M1	30

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 110113375

Parameter	MS Sample ID: 110113375			MSD Sample ID: 110113375			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	74	270	-46	74	300	-6	11	304 M1, N2	30
Acenaphthene	74	243	-25	74	311	67	25	261 M1	30
Acenaphthylene	74	448	-94	74	688	230	42	517 M1, R1	30
Anthracene	74	661	-261	74	999	195	41	854 M1, R1	30
Benzo(a)anthracene	74	1380	-832	74	1980	-21	36	1990 M1, R1	30
Benzo(a)pyrene	74	1500	-1010	74	2220	-38	39	2240 M1, R1	30
Benzo(a,b)fluoranthene	88.9	1730	-885	88.9	2530	14	38	2510 M1, N2, R1	30
Benzo(e)pyrene	74	1130	-651	74	1620	12	36	1610 M1, N2, R1	30
Benzo(g,h,i)perylene	74	624	-791	74	954	-344	42	1210 M1, R1	30
Benzo(k)fluoranthene	74	1270	-509	74	1720	100	30	1650 M1	30
Chrysene	74	1740	-1040	74	2450	-74	34	2510 M1, R1	30
Dibenz(a,h)anthracene	74	259	-163	74	389	14	40	379 M1, R1	30
Fluoranthene	74	3470	-1970	74	5060	172	37	4930 M1, R1	30
Fluorene	74	324	-63	74	415	60	25	370 M1	30
Indeno(1,2,3-cd)pyrene	74	671	-709	74	986	-282	38	1200 M1, R1	30
Naphthalene	74	124	-.3	74	134	14	8	124 M1, N2	30
Perylene	74	396	-170	74	552	41	33	521 M1, N2, R1	30
Phenanthrene	74	1840	-1190	74	2610	-158	34	2730 M1, R1	30
Pyrene	74	2810	-1760	74	4040	-98	36	4110 M1, R1	30

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 111213043

Parameter	MS Sample ID: 111213043			MSD Sample ID: 111213043			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	98.3	103 J	83	98.3	107	87		20.9 JN2	30
Acenaphthene	98.3	120 J	80	98.3	117	77		41.0 J	30
Acenaphthylene	98.3	199	98	98.3	179	77	11	103 J	30
Anthracene	98.3	267	104	98.3	234	71	13	165	30
Benzo(a)anthracene	98.3	675	160	98.3	543	26	22	517 M1	30
Benzo(a)pyrene	98.3	912	220	98.3	728	33	22	696 M1	30
Benzo(a,b)fluoranthene	118	1080	177	118	899	26	18	869 M1, N2	30
Benzo(e)pyrene	98.3	744	181	98.3	610	45	20	566 M1, N2	30
Benzo(g,h,i)perylene	98.3	505	77	98.3	386	-44	27	430 M1	30
Benzo(k)fluoranthene	98.3	779	158	98.3	700	78	11	623 M1	30
Chrysene	98.3	916	180	98.3	747	8	20	739 M1	30
Dibenz(a,h)anthracene	98.3	199	76	98.3	162	39	20	124 J	30
Fluoranthene	98.3	1660	360	98.3	1300	-3	24	1300 M1	30
Fluorene	98.3	136 J	85	98.3	124	72		52.7 J	30
Indeno(1,2,3-cd)pyrene	98.3	532	101	98.3	414	-19	25	432 M1	30
Naphthalene	98.3	94.5 J	76	98.3	92.5	74		19.5 JN2	30
Perylene	98.3	290	115	98.3	252	76	14	177 N2	30
Phenanthrene	98.3	605	129	98.3	510	33	17	477	30
Pyrene	98.3	1290	239	98.3	1090	30	17	1060 M1	30

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 112013331

Parameter	MS Sample ID: 112013331			MSD Sample ID: 112013331			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	65.9	228	201	65.9	370	415	47	95.4 JH2, M1, N2,	30
Acenaphthene	65.9	599	401	65.9	2180	2790	114	334 H2, M1, R1	30
Acenaphthylene	65.9	343	108	65.9	643	561	61	272 H2, M1, R1	30
Anthracene	65.9	1440	1500	65.9	5140	7080	112	457 H2, M1, R1	30
Benzo(a)anthracene	65.9	2450	2090	65.9	8370	11000	109	1070 H2, M1, R1	30
Benzo(a)pyrene	65.9	2400	1780	65.9	7010	8740	98	1230 H2, M1, R1	30
Benzo(a,b)fluoranthene	79.2	3290	1980	79.2	10600	11200	105	1720 H2, M1, N2,	30
Benzo(e)pyrene	65.9	1610	1110	65.9	4760	5860	99	876 H2, M1, N2,	30
Benzo(g,h,i)perylene	65.9	1180	714	65.9	3390	4060	97	706 H2, M1, R1	30
Benzo(k)fluoranthene	65.9	1250	981	65.9	3610	4560	97	599 H2, M1, R1	30
Chrysene	65.9	2650	2000	65.9	8290	10500	103	1340 H2, M1, R1	30
Dibenz(a,h)anthracene	65.9	387	305	65.9	1070	1340	94	186 H2, M1, R1	30
Fluoranthene	65.9	5550	4580	65.9	16600	21300	100	2530 H2, M1, R1	30
Fluorene	65.9	768	684	65.9	2440	3200	104	316 H2, M1, R1	30
Indeno(1,2,3-cd)pyrene	65.9	1090	749	65.9	3220	3970	99	596 H2, M1, R1	30
Naphthalene	65.9	162	158	65.9	202	218	22	58.0 JH2, M1, N2	30
Perylene	65.9	645	521	65.9	2130	2760	107	302 H2, M1, N2,	30
Phenanthrene	65.9	4320	4050	65.9	13100	17400	101	1650 H2, M1, R1	30
Pyrene	65.9	4580	3630	65.9	15600	20200	109	2180 H2, M1, R1	30

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 092413813

Parameter	MS Sample ID: 121013868			MSD Sample ID: 121013868			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	41.5	195	253	41.5	154	155	23	89.9 M1, N2	30
Acenaphthene	41.5	161	263	41.5	126	179	24	51.8 JM1	30
Acenaphthylene	41.5	77.2	148	41.5	77.7	149	0.7	15.6 J	30
Anthracene	41.5	135	228	41.5	131	218	3	40.7 JM1	30
Benzo(a)anthracene	41.5	111	191	41.5	114	198	3	31.8 JM1	30
Benzo(a)pyrene	41.5	112	194	41.5	116	203	3	31.3 JM1	30
Benzo(a,b)fluoranthene	49.8	110	159	49.8	119	176	8	31.1 JM1, N2	30
Benzo(e)pyrene	41.5	80.0	147	41.5	85	159	6	18.8 JM1, N2	30
Benzo(g,h,i)perylene	41.5	45.6 J	76	41.5	48.4	82		14.1 J	30
Benzo(k)fluoranthene	41.5	67.4	136	41.5	64.3	128	5	10.8 J	30
Chrysene	41.5	113	187	41.5	121	206	7	34.9 JM1	30
Dibenz(a,h)anthracene	41.5	30.4 J	65	41.5	30.5	65		3.5 J	30
Fluoranthene	41.5	182	298	41.5	187	309	3	58.3 JM1	30
Fluorene	41.5	104	185	41.5	91.7	156	12	26.7 JM1	30
Indeno(1,2,3-cd)pyrene	41.5	42.2 J	77	41.5	43.6	80		10.2 J	30
Naphthalene	41.5	200	207	41.5	175	145	14	114 M1, N2	30
Perylene	41.5	50.9 J	109	41.5	51.5	110		12.5 UN2	30
Phenanthrene	41.5	318	483	41.5	289	411	10	118 M1	30
Pyrene	41.5	241	378	41.5	241	379	0.3	83.5 M1	30

Table 3-37. Sediment Alkylated PAH by SIM LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 276509			QC Batch: 277680			QC Batch: 278046		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	41	125	33.3	28.1	84	33.3	26.3	79	33.3	28.0	84
Acenaphthene	41	125	33.3	24.4	73	33.3	24.0	72	33.3	25.7	77
Acenaphthylene	43	125	33.3	26.1	78	33.3	26.3	79	33.3	28.4	85
Anthracene	39	142	33.3	27.6	83	33.3	26.6	80	33.3	27.6	83
Benzo(a)anthracene	48	131	33.3	27.2	82	33.3	27.2	82	33.3	28.3	85
Benzo(a)pyrene	52	125	33.3	28.6	86	33.3	28.9	87	33.3	29.4	88
Benzo(a,b)fluoranthene	41	150	40	32.4	81	40	30.9	77	40	34.8	87
Benzo(e)pyrene	47	138	33.3	26.2	78	33.3	25.6	77	33.3	27.2	82
Benzo(g,h,i)perylene	46	132	33.3	27.3	82	33.3	27.4	82	33.3	27.8	83
Benzo(k)fluoranthene	49	139	33.3	27.2	82	33.3	27.1	81	33.3	31.7	95
Chrysene	70	130	33.3	26.2	79	33.3	26.0	78	33.3	27.0	81
Dibenz(a,h)anthracene	46	143	33.3	28.3	85	33.3	28.4	85	33.3	28.4	85
Fluoranthene	47	146	33.3	28.6	86	33.3	27.8	83	33.3	30.8	93
Fluorene	38	135	33.3	25.3	76	33.3	24.4	73	33.3	27.2	82
Indeno(1,2,3-cd)pyrene	48	136	33.3	27.3	82	33.3	26.9	81	33.3	27.2	81
Naphthalene	38	125	33.3	24.1	72	33.3	23.1	69	33.3	25.0	75
Perylene	33	125	33.3	30.9	93	33.3	30.6	92	33.3	31.4	94
Phenanthrene	40	136	33.3	24.9	75	33.3	23.9	72	33.3	25.4	76
Pyrene	50	137	33.3	28.8	86	33.3	27.5	83	33.3	30.5	91

Table 3-37. Sediment Alkylated PAH by SIM LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 278384			QC Batch: 279425			QC Batch: 279577		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	41	125	33.3	27.5	82	33.3	26.7	80	33.3	27.5	82
Acenaphthene	41	125	33.3	25.2	76	33.3	24.1	72	33.3	24.9	75
Acenaphthylene	43	125	33.3	26.8	81	33.3	24.6	74	33.3	25.4	76
Anthracene	39	142	33.3	28.4	85	33.3	26.0	78	33.3	26.0	78
Benzo(a)anthracene	48	131	33.3	27.7	83	33.3	25.8	77	33.3	25.5	76
Benzo(a)pyrene	52	125	33.3	29.2	88	33.3	27.5	82	33.3	26.7	80
Benzo(a,b)fluoranthene	41	150	40	32.2	80	40	30.7	77	40	30.7	77
Benzo(e)pyrene	47	138	33.3	26.4	79	33.3	25.4	76	33.3	24.8	74
Benzo(g,h,i)perylene	46	132	33.3	26.2	79	33.3	23.2	70	33.3	21.9	66
Benzo(k)fluoranthene	49	139	33.3	26.9	81	33.3	26.7	80	33.3	25.7	77
Chrysene	70	130	33.3	26.2	79	33.3	26.1	78	33.3	25.5	77
Dibenz(a,h)anthracene	46	143	33.3	27.0	81	33.3	23.7	71	33.3	22.3	67
Fluoranthene	47	146	33.3	28.5	85	33.3	26.8	80	33.3	26.3	79
Fluorene	38	135	33.3	25.2	76	33.3	24.8	75	33.3	25.8	77
Indeno(1,2,3-cd)pyrene	48	136	33.3	25.3	76	33.3	23.5	70	33.3	22.3	67
Naphthalene	38	125	33.3	23.9	72	33.3	24.2	73	33.3	24.4	73
Perylene	33	125	33.3	31.8	96	33.3	31.0	93	33.3	29.7	89
Phenanthrene	40	136	33.3	25.8	77	33.3	25.1	75	33.3	25.2	75
Pyrene	50	137	33.3	27.6	83	33.3	27.9	84	33.3	27.6	83

Table 3-37. Sediment Alkylated PAH by SIM LCS Results Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 280237			QC Batch: 280539			QC Batch: 281203			QC Batch: 282377		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	41	125	33.3	24.2	73	33.3	23.2	70	33.3	28.3	85	33.3	28.6	86
Acenaphthene	41	125	33.3	22.9	69	33.3	21.5	65	33.3	25.6	77	33.3	25.2	76
Acenaphthylene	43	125	33.3	23.3	70	33.3	22.1	66	33.3	26.7	80	33.3	26.1	78
Anthracene	39	142	33.3	25.7	77	33.3	24.2	73	33.3	27.0	81	33.3	26.8	81
Benzo(a)anthracene	48	131	33.3	26.4	79	33.3	25.6	77	33.3	26.0	78	33.3	26.1	78
Benzo(a)pyrene	52	125	33.3	27.3	82	33.3	26.1	78	33.3	27.2	82	33.3	26.7	80
Benzo(a,b)fluoranthene	41	150	40	32.5	81	40	30.6	76	40	32.7	82	40	29.7	74
Benzo(e)pyrene	47	138	33.3	28.4	85	33.3	27.4	82	33.3	28.6	86	33.3	27.1	81
Benzo(g,h,i)perylene	46	132	33.3	23.1	69	33.3	22.6	68	33.3	23.5	70	33.3	22.8	68
Benzo(k)fluoranthene	49	139	33.3	27.1	81	33.3	25.7	77	33.3	27.1	81	33.3	25.0	75
Chrysene	70	130	33.3	27.0	81	33.3	25.9	78	33.3	26.7	80	33.3	26.3	79
Dibenz(a,h)anthracene	46	143	33.3	23.8	71	33.3	23.1	69	33.3	24.0	72	33.3	22.4	67
Fluoranthene	47	146	33.3	27.8	83	33.3	26.8	80	33.3	27.9	84	33.3	27.0	81
Fluorene	38	135	33.3	25.2	76	33.3	23.6	71	33.3	27.2	81	33.3	26.2	78
Indeno(1,2,3-cd)pyrene	48	136	33.3	23.9	72	33.3	23.3	70	33.3	24.2	73	33.3	23.0	69
Naphthalene	38	125	33.3	22.0	66	33.3	21.1	63	33.3	25.9	78	33.3	26.4	79
Perylene	33	125	33.3	27.3	82	33.3	27.1	81	33.3	28.3	85	33.3	28.3	85
Phenanthrene	40	136	33.3	25.3	76	33.3	24.0	72	33.3	26.3	79	33.3	26.0	78
Pyrene	50	137	33.3	28.7	86	33.3	27.6	83	33.3	28.3	85	33.3	28.9	87

Data Validation Report

2069 NORTH BRANCH

**(Division Street Former MGP Site
and Willow Street / Hawthorne Avenue Station OU)**

Sediment Sample Analyses Performed by

**Pace Analytical, Green Bay
Pace Analytical, Minneapolis**

Prepared for



Prepared by

SHEPHERD TECHNICAL SERVICES

February 21, 2013

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1.0 INTRODUCTION

All data validation was performed by Shepherd Technical Services following US EPA National Functional Guidelines (NFG), where applicable, using electronic deliverables.

Pace Analytical Services, Inc., Green Bay, WI performed the sample analyses on the sediment samples except for alkylated polycyclic aromatic hydrocarbons (PAHs). The Pace Green Bay laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200050). The Pace laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Florida Department of Health Laboratory Accreditation Program (ID #E87948).

Pace Analytical Services, Inc., Minneapolis performed the analyses for alkylated polycyclic aromatic hydrocarbons (PAHs). The Pace Minneapolis laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200011). The Pace Minneapolis laboratory also holds primary accreditation under the National Environmental Laboratory Accreditation Program (NELAP) by the Minnesota Department of Health Laboratory Accreditation Program (ID # 027-053-137).

The laboratories provided all analytical data, including all internal laboratory QC results in an electronic deliverable format.

Sediment samples were collected January 25 to February 13, 2012 at the Division Street Station and Willow Street/Hawthorne Avenue Station sites. The archived samples from the original sampling events were organized into 6 sample delivery groups (SDGs, or laboratory lot numbers) performed by Pace.

Table 1-1. Sample Identification Cross Reference

Field ID	Pace Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 8270 by SIM
012512114	4056488022		X	X
012512115	4056488023	X	X	
012512116	4056488024		X	X
012612172	4056488059		X	X
012612173	4056488060		X	X
012612174	4056488061		X	X
012712208	4056488111		X	X
012712209	4056488112		X	X
012712210	4056488113		X	X
012712211	4056488114		X	X
012712212	4056488115		X	X
012712213	4056488116		X	X
012712214	4056488117		X	X
012712224	4056488120		X	X

Field ID	Pace Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 8270 by SIM
012712234	4056488124		X	X
012712235	4056488125	X	X	
012712248	4056488105		X	X
012712249	4056488106		X	X
012712250	4056488107		X	X
012712251	4056488108	X	X	
013012261	4056555002		X	X
013012262	4056555003		X	X
013012263	4056555004		X	X
013012264	4056555005		X	X
013012265	4056555006		X	X
013012266	4056555007		X	X
013012282	4056488089		X	X
013012283	4056488090		X	X
013012294	4056488096		X	X
013012296	4056488097		X	X
013012297	4056488098		X	X
013012298	4056488099		X	X
013012311	4056486006		X	X
013012312	4056486007		X	X
013012313	4056486008		X	X
013012314	4056486009		X	X
013012328	4056486020		X	X
013012329	4056486021	X	X	
013112340	4056486025		X	X
013112341	4056486026		X	X
013112342	4056486027		X	X
013112343	4056486028		X	X
013112344	4056486029		X	X
013112345	4056486030		X	X
013112347	4056486032		X	X
013112359	4056486041		X	X
013112360	4056486042		X	X
013112361	4056486043		X	X
013112362	4056486044		X	X
013112374	4056486051		X	X
013112375	4056486052		X	X
013112376	4056486053		X	X
013112377	4056486054		X	X
013112390	4056486064		X	X
013112391	4056486065		X	X

Field ID	Pace Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 8270 by SIM
013112410	4056746011		X	X
013112411	4056746012		X	X
020112458	4056746036		X	X
020112459	4056746037		X	X
020112464	4056746042		X	X
020212486	4056746089		X	X
020212487	4056746090		X	X
020212488	4056746091		X	X
020212489	4056746092	X	X	
020212495	4056746093		X	X
020212496	4056746094	X	X	
020212501	4056746099		X	X
020212502	4056746100		X	X
020212503	4056746101		X	X
020212534	4056746063		X	X
020212535	4056746064	X	X	
020212546	4056746069	X	X	
020212547	4056746070		X	X
020212548	4056746071		X	X
020212549	4056746072		X	X
020212550	4056746073		X	X
020212551	4056746074		X	X
020312589	4056746125		X	X
020312590	4056746126		X	X
020312603	4056746134		X	X
020312604	4056746135		X	X
020312605	4056746136		X	X
020712715	4056746203		X	X
020712716	4056746204		X	X
020712717	4056746205		X	X
020712720	4056746206		X	X
020712754	4056746229		X	X
020812766	4056746234		X	X
020812767	4056746235		X	X
020812768	4056746236		X	X
020812774	4056746237		X	X
020812775	4056746238		X	X
020812788	4056746244		X	X
020812789	4056746245		X	X
020812805	4056746256		X	X
020812806	4056746257		X	X

Field ID	Pace Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 8270 by SIM
020812807	4056746258	X	X	
020912838	4056796017		X	X
020912839	4056796018		X	X
021012913	4056900025	X	X	
021012914	4056900026		X	X
021312930	4056900034		X	X
021312931	4056900035		X	X
021312932	4056900036	X	X	

2.0 ORGANIC DATA REVIEW

Blank and spiked results were provided. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples. Sodium sulfate was used as the matrix for method blanks for the semivolatile organics (PAHs, and Alkylated PAHs) analyses.

Sediment samples were analyzed for organic compounds following SW-846 Methods or laboratory developed methods as shown in Table 2-1.

Table 2-1. Organic Analytes and Methods Summary

Analytical Method	Analyte
EPA 8270 by SIM	Polycyclic Aromatic Hydrocarbons (PAH)
Alkylated PAH by SIM	Alkylated PAHs

Since all of the samples in this data set are archived samples, all samples were analyzed outside method required holding times. Recognizing the obvious, no further flags were added to the sample data to indicate this, the reviewer assumes the user is aware of the limitations of data from archived samples.

2.1 SW-846 Method 8270C/SIM –PAHs

2.1.1 Summary

SW-846 Method 8270C/SIM employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM).

2.1.2 Method Blanks

The samples were prepared in five different preparation batches. None of the method blanks associated with these batches showed any detectable contamination. Therefore, no data are

qualified as a consequence of method blank data. The results for the method blanks are summarized in Table 2-2.

2.1.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. No data are qualified as a consequence of the continuing calibration data.

The peak shapes and chromatographic resolution for the isomers benzo(b)fluoranthene and benzo(k)fluoranthene evident in the sample chromatograms for the samples indicate that the two isomers are not adequately resolved to be quantitated separately as the laboratory attempted to do. The laboratory's report narratives noted this issue but stopped short of reporting the two isomers as a coeluting pair (as is done for *m/p*-xylene). Consequently all positive results for benzo(b)fluoranthene and benzo(k)fluoranthene in all samples for these two isomers are qualified as estimated (“J”).

2.1.4 Internal Standard Areas

All internal standard areas met the method criteria.

2.1.5 Surrogate Compound Recoveries

Two surrogates, 2-fluorobiphenyl and terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., PAHs), the surrogates reported should be adequate to monitor recovery in the analyses.

In two cases, sample 012512116 and 020812775 surrogate compound recoveries are reported with a 0% recovery as a result of sample dilution due to high analyte concentrations or high amounts of non-target analytes present in the samples. In this case, the laboratory appended their “S4” qualifier to indicate dilution as the cause for the low recovery. Sample dilution, when warranted, is not cause to further qualify sample results

The surrogate recoveries for all samples are presented in Table 2-3.

2.1.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on four samples in this data set.

Several of the samples gave failing recoveries one or more of the analytes. Several samples also gave RPD values exceeding the laboratory limits for the respective analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. Except for those samples where more than half of the analytes failed to recover within limits (an arbitrary threshold), no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data. Recoveries for sample 020812774 failed for more than half of the analytes but had a sample dilution of 40x. Therefore, no data re qualified. However, for sample 020812774 where more than half of the analytes failed to recover within limits (with no mitigating dilution), data for only that sample is qualified as estimated (“J”, “UJ”).

The matrix spike/matrix spike duplicate results are summarized in Tables 2-3 through 2-6.

2.1.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. All of the analytes for all laboratory control samples recovered within the limits used by the laboratory.

The laboratory control sample results are given in Table 2-7.

2.1.8 Field Duplicates

No project specific field duplicates were analyzed with this data.

Table 2-2. Method 8270-SIM Method Blank Analytical Results Summary

Analyte	Units	QC Batch: 112086	QC Batch: 113156	QC Batch: 113157	QC Batch: 113158	QC Batch: 113268
2-Methylnaphthalene	µg/Kg	1.6 U				
Acenaphthene	µg/Kg	8.3 U				
Acenaphthylene	µg/Kg	8.3 U				
Anthracene	µg/Kg	1.7 U				
Benzo(a)anthracene	µg/Kg	8.3 U				
Benzo(a)pyrene	µg/Kg	8.3 U				
Benzo(b)fluoranthene	µg/Kg	2.4 U				
Benzo(e)pyrene	µg/Kg	8.3 U				
Benzo(g,h,i)perylene	µg/Kg	8.3 U				
Benzo(k)fluoranthene	µg/Kg	8.3 U				
Chrysene	µg/Kg	1.9 U				
Dibenz(a,h)anthracene	µg/Kg	8.3 U				
Fluoranthene	µg/Kg	8.3 U				
Fluorene	µg/Kg	8.3 U				
Indeno(1,2,3-cd)pyrene	µg/Kg	8.3 U				
Naphthalene	µg/Kg	3.1 U				
Phenanthrene	µg/Kg	2.1 U				
Pyrene	µg/Kg	8.3 U				

Table 2-3. Method 8270-SIM Surrogate Results Summary

Lab Sample Number	Field ID	2-Fluorobiphenyl		Terphenyl- <i>d</i> ₁₄	
	Limits:	43	130	32	130
4056486006	013012311	85		93	
4056486007	013012312	90		95	
4056486008	013012313	86		85	
4056486009	013012314	91		93	
4056486020	013012328	85		77	
4056486025	013112340	94		97	
4056486026	013112341	86		89	
4056486027	013112342	92		89	
4056486028	013112343	86		88	
4056486029	013112344	93		91	
4056486030	013112345	98		98	
4056486032	013112347	90		99	
4056486041	013112359	95		91	
4056486042	013112360	86		85	
4056486043	013112361	83		78	
4056486044	013112362	77		77	

Lab Sample Number	Field ID	2-Fluorobiphenyl		Terphenyl- <i>d</i> ₁₄	
		Limits:	43	130	32
4056486051	013112374		75		85
4056486052	013112375		81		81
4056486053	013112376		75		77
4056486054	013112377		91		93
4056486064	013112390		93		95
4056486065	013112391		83		77
4056488022	012512114		69		80
4056488024	012512116		0 S4		0 S4
4056488059	012612172		72		73
4056488060	012612173		66		78
4056488061	012612174		67		71
4056488089	013012282		60		59
4056488090	013012283		76		89
4056488096	013012294		78		83
4056488097	013012296		79		79
4056488098	013012297		65		75
4056488099	013012298		65		77
4056488105	012712248		66		77
4056488106	012712249		64		77
4056488107	012712250		76		92
4056488111	012712208		69		76
4056488112	012712209		81		73
4056488113	012712210		75		85
4056488114	012712211		75		83
4056488115	012712212		67		77
4056488116	012712213		84		74
4056488117	012712214		81		77
4056488120	012712224		93		95
4056488124	012712234		85		93
4056555002	013012261		93		95
4056555003	013012262		87		91
4056555004	013012263		82		92
4056555005	013012264		86		91
4056555006	013012265		78		85
4056555007	013012266		85		91
4056746011	013112410		64		68
4056746012	013112411		75		83
4056746036	020112458		94		94
4056746037	020112459		81		91
4056746042	020112464		87		89
4056746063	020212534		88		87
4056746070	020212547		88		84
4056746071	020212548		91		97
4056746072	020212549		88		89

Lab Sample Number	Field ID	2-Fluorobiphenyl		Terphenyl- <i>d</i> ₁₄	
		Limits:	43	130	32
4056746073	020212550		100		101
4056746074	020212551		88		90
4056746089	020212486		89		92
4056746090	020212487		95		96
4056746091	020212488		86		94
4056746093	020212495		95		98
4056746099	020212501		94		95
4056746100	020212502		96		98
4056746101	020212503		87		87
4056746125	020312589		95		95
4056746126	020312590		94		97
4056746134	020312603		85		85
4056746135	020312604		91		106
4056746136	020312605		96		101
4056746203	020712715		93		98
4056746204	020712716		88		87
4056746205	020712717		87		92
4056746206	020712720		67		77
4056746229	020712754		89		91
4056746234	020812766		95		97
4056746235	020812767		100		89
4056746236	020812768		93		88
4056746237	020812774		83		79
4056746238	020812775		0 S4		0 S4
4056746244	020812788		98		94
4056746245	020812789		88		93
4056746256	020812805		99		103
4056746257	020812806		84		85
4056796017	020912838		99		101
4056796018	020912839		81		80
4056900026	021012914		93		99
4056900034	021312930		88		92
4056900035	021312931		91		91

Table 2-3. Method 8270-SIM MS/MSD Recoveries

Analyte	MS Sample ID: 012512114			MSD Sample ID: 012512114			RPD	Lab Sample Result (µg/Kg)	RPD Limit
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)			
2-Methylnaphthalene	3640	4500	23	3640	5460	49	19	3670 H2, M1	33
Acenaphthene	3640	3440	55	3640	3740	63	8	1430 H2	20
Acenaphthylene	3640	3150	76	3640	3280	79	4	402 H2	20
Anthracene	3640	4240	63	3640	4710	76	11	1930 H2	24
Benzo(a)anthracene	3640	4860	64	3640	6190	100	24	2530 H2	25
Benzo(a)pyrene	3640	5180	66	3640	6420	101	21	2760 H2	31
Benzo(b)fluoranthene	3640	5030	48	3640	7150	106	35	3280 H2	29
Benzo(e)pyrene	3640	4780	71	3640	5750	97	18	2210 H2	20
Benzo(g,h,i)perylene	3640	4790	75	3640	5590	97	16	2050 H2	23
Benzo(k)fluoranthene	3640	5100	81	3640	5420	90	6	2140 H2	33
Chrysene	3640	5530	57	3640	7160	101	26	3460 H2	31
Dibenz(a,h)anthracene	3640	3770	87	3640	4100	96	8	618 H2	23
Fluoranthene	3640	7860	41	3640	10300	108	27	6360 H2, M1	28
Fluorene	3640	3370	61	3640	3740	71	10	1150 H2	22
Indeno(1,2,3-cd)pyrene	3640	4580	75	3640	5270	94	14	1830 H2	27
Naphthalene	3640	4200	-75	3640	5860	-29	33	6920 H2, M1	33
Phenanthrene	3640	7400	18	3640	9610	79	26	6750 H2, M1	27
Pyrene	3640	8410	48	3640	11500	134	31	6640 H2, M1	23

Table 2-4. Method 8270-SIM MS/MSD Recoveries

Analyte	MS Sample ID: 013012282			MSD Sample ID: 013012282			RPD	Lab Sample Result (µg/Kg)	RPD Limit
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)			
2-Methylnaphthalene	4040	4270	80	4040	4150	77	3	1050 H2	33
Acenaphthene	4040	4370	94	4040	3960	84	10	567 H2	20
Acenaphthylene	4040	4060	93	4040	3430	77	17	303 H2	20
Anthracene	4040	4710	95	4040	4590	92	3	861 H2	24
Benzo(a)anthracene	4040	5740	93	4040	6220	105	8	1980 H2	25
Benzo(a)pyrene	4040	6290	99	4040	6920	114	9	2300 H2	31
Benzo(b)fluoranthene	4040	6640	102	4040	8210	141	21	2520 H2, M1	29
Benzo(e)pyrene	4040	5820	97	4040	6520	114	11	1900 H2	20
Benzo(g,h,i)perylene	4040	4650	81	4040	4830	85	4	1390 H2	23
Benzo(k)fluoranthene	4040	5760	83	4040	6060	91	5	2400 H2	33
Chrysene	4040	6500	90	4040	7860	123	19	2890 H2	31
Dibenz(a,h)anthracene	4040	4010	87	4040	3890	84	3	506 H2	23
Fluoranthene	4040	8970	88	4040	10100	117	12	5410 H2	28
Fluorene	4040	4580	98	4040	4250	89	8	636 H2	22
Indeno(1,2,3-cd)pyrene	4040	4670	84	4040	4780	86	2	1290 H2	27
Naphthalene	4040	5430	76	4040	5740	83	6	2380 H2	33
Phenanthrene	4040	7380	91	4040	8510	119	14	3710 H2	27
Pyrene	4040	8700	109	4040	10500	155	19	4300 H2, M1	23

Table 2-5. Method 8270-SIM MS/MSD Recoveries

Analyte	MS Sample ID: 020212486			MSD Sample ID: 020212486			RPD	Lab Sample Result (µg/Kg)	RPD Limit
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)			
2-Methylnaphthalene	3160	3460	78	3160	3600	83	4	996 H2	33
Acenaphthene	3160	3430	91	3160	3660	99	6	546 JH2	20
Acenaphthylene	3160	3500	99	3160	3580	102	2	366 JH2	20
Anthracene	3160	4350	99	3160	4520	104	4	1230 H2	24
Benzo(a)anthracene	3160	5360	82	3160	5720	93	6	2790 H2	25
Benzo(a)pyrene	3160	5900	90	3160	6160	98	4	3070 H2	31
Benzo(b)fluoranthene	3160	6320	85	3160	6630	95	5	3630 H2	29
Benzo(e)pyrene	3160	5350	91	3160	5560	97	4	2480 H2	20
Benzo(g,h,i)perylene	3160	3730	67	3160	3910	72	5	1630 H2	23
Benzo(k)fluoranthene	3160	5800	98	3160	6020	105	4	2700 H2	33
Chrysene	3160	6590	80	3160	6990	93	6	4050 H2	31
Dibenz(a,h)anthracene	3160	3200	83	3160	3270	85	2	596 JH2	23
Fluoranthene	3160	10400	81	3160	11100	104	7	7820 H2	28
Fluorene	3160	3880	101	3160	3810	99	2	685 H2	22
Indeno(1,2,3-cd)pyrene	3160	3970	78	3160	4030	80	1	1520 H2	27
Naphthalene	3160	3170	76	3160	3610	90	13	775 H2	33
Phenanthrene	3160	8020	86	3160	8610	105	7	5300 H2	27
Pyrene	3160	8580	64	3160	9900	106	14	6570 H2	23

Table 2-6. Method 8270-SIM MS/MSD Recoveries

Analyte	MS Sample ID: 020812774			MSD Sample ID: 020812774			RPD	Lab Sample Result (µg/Kg)	RPD Limit
	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)			
2-Methylnaphthalene	3750	96200	302	3750	135000	1350	34	84900 H2, M6	33
Acenaphthene	3750	115000	660	3750	166000	2020	36	90100 H2, M6	20
Acenaphthylene	3750	9430	137	3750	13100	235	33	4310 JH2, M6	20
Anthracene	3750	63200	587	3750	91500	1340	37	41200 H2, M6	24
Benzo(a)anthracene	3750	27700	247	3750	41600	620	40	18400 H2, M6	25
Benzo(a)pyrene	3750	26600	226	3750	41800	633	45	18100 H2, M6	31
Benzo(b)fluoranthene	3750	15400	169	3750	23600	386	42	9120 H2, M6	29
Benzo(e)pyrene	3750	15900	157	3750	24300	382	42	9990 H2, M6	20
Benzo(g,h,i)perylene	3750	13700	136	3750	20500	319	40	8570 H2, M6	23
Benzo(k)fluoranthene	3750	16100	150	3750	23900	360	39	10400 H2, M6	33
Chrysene	3750	28800	275	3750	42200	632	38	18500 H2, M6	31
Dibenz(a,h)anthracene	3750	5260 J	88	3750	6980	134	41	3750 UH2	23
Fluoranthene	3750	61000	495	3750	93000	1350	41	42500 H2, M6	28
Fluorene	3750	45700	347	3750	64900	857	35	32700 H2, M6	22
Indeno(1,2,3-cd)pyrene	3750	10700	115	3750	15900	254	39	6420 JH2, M6	27
Naphthalene	3750	361000	966	3750	515000	5070	35	325000 H2, M6	33
Phenanthrene	3750	159000	1170	3750	229000	3050	36	115000 H2, M6	27
Pyrene	3750	77200	640	3750	110000	1510	35	53300 H2, M6	23

Table 2-7. Method 8270-SIM Laboratory Control Sample Results Summary

Analyte	Spike (µg/Kg)	Limits (%)		QC Batch: 112086		QC Batch: 113156		QC Batch: 113157		QC Batch: 113158		QC Batch: 113268	
				Result (µg/Kg)	Recovery (%)								
2-Methylnaphthalene	333	45	130	240	72	255	77	260	78	238	71	233	70
Acenaphthene	333	51	130	275	83	301	90	293	88	282	85	287	86
Acenaphthylene	333	53	130	282	85	304	91	300	90	281	84	297	89
Anthracene	333	48	130	335	101	345	104	337	101	339	102	327	98
Benzo(a)anthracene	333	55	130	301	90	305	91	305	92	305	92	267	80
Benzo(a)pyrene	333	56	130	281	84	321	96	300	90	307	92	275	83
Benzo(b)fluoranthene	333	53	130	362	109	300	90	325	98	318	95	281	84
Benzo(e)pyrene	333	45	135	316	95	321	96	324	97	330	99	280	84
Benzo(g,h,i)perylene	333	58	130	252	76	315	94	327	98	324	97	274	82
Benzo(k)fluoranthene	333	55	130	274	82	327	98	330	99	320	96	255	77
Chrysene	333	59	130	291	87	301	90	308	92	311	93	273	82
Dibenz(a,h)anthracene	333	56	130	268	80	325	98	329	99	328	98	277	83
Fluoranthene	333	56	130	343	103	328	98	317	95	325	98	308	92
Fluorene	333	54	130	344	103	321	96	311	93	304	91	300	90
Indeno(1,2,3-cd)pyrene	333	57	130	264	79	320	96	324	97	324	97	273	82
Naphthalene	333	43	130	230	69	236	71	262	79	222	67	227	68
Phenanthrene	333	56	130	319	96	329	99	321	96	322	97	311	93
Pyrene	333	54	130	283	85	332	99	336	101	336	101	233	70

2.2 Alkylated PAHs

2.2.1 Summary

Analysis for alkylated PAHs was performed using a method developed by the analytical laboratory. The method employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM). Results are reported as compound classes (e.g., “C2-Fluorenes”) rather than specific alkylated moieties.

Documentation of sample IDs in the sample preparation records appears to contain an error in the sample IDs. What is recorded as samples 4056486064, 6069, 6092, 6094 should be 4056746064, 6069, 6092, 6094 based on what is requested on the chain of custody and recorded in the run log. There are also data reports as SDG 10208278 that appear to actually be SDG 4056488. No data are qualified as a result of these discrepancies, however the data user should be aware of the anomalous entries.

2.2.2 Method Blanks

The samples were prepared in a single preparation batches. None of the target compounds for this method gave a positive result. Therefore, no data are qualified due to method blank contamination.

The results for the method blanks are summarized in Table 2-7 of the Report Tables document.

2.2.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for the alkylated PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes.

2.2.4 Surrogate Compound Recoveries

Three surrogates, 2-fluorobiphenyl, nitrobenzene-*d*₅, and terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern

(i.e., alkylated PAHs), the surrogates reported should be adequate to monitor recovery in the analyses. Note that the report narratives do not address failed surrogate recoveries for this test.

In most cases the surrogate was recovered at 0%. However, sample dilutions range from 10x to 500x, generally precluding any recovery of the surrogate compounds. Lack of recovery of the surrogate compounds as a result of sample dilution is not cause for qualification of sample data. No data are qualified based upon surrogate recovery results.

The surrogate recoveries for all samples are presented in Table 2-8.

2.2.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on a non-client specific sample. For this particular test, recoveries for the non-alkylated PAHs are reported. The MS/MSD met the criteria for these compounds.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. No data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

2.2.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. As is true for the matrix spike/matrix spike duplicate analyses, For this particular test, recoveries for the non-alkylated PAHs are reported.

All of the analytes for all of the laboratory control samples recovered within the limits used by the laboratory. No data are qualified based upon laboratory control sample results.

The laboratory control sample results are given in Table 2-9.

2.2.7 Field Duplicates

No project specific field duplicates were analyzed with this data.

Table 2-7. Alkylated PAH by SIM Method Blank Analytical Results Summary

Analyte	Units	QC Batch: 227746
2-Methylnaphthalene	µg/Kg	5.0 U
Acenaphthene	µg/Kg	5.0 U
Acenaphthylene	µg/Kg	5.0 U
Anthracene	µg/Kg	5.0 U
Benzo(a)anthracene	µg/Kg	5.0 U
Benzo(a)pyrene	µg/Kg	5.0 U
Benzo(a,b)fluoranthene	µg/Kg	5.0 U
Benzo(e)pyrene	µg/Kg	5.0 U
Benzo(g,h,i)perylene	µg/Kg	5.0 U
Benzo(k)fluoranthene	µg/Kg	5.0 U
C1-Chrysenes	µg/Kg	5.0 U
C1-Fluoranthenes/Pyrenes	µg/Kg	5.0 U
C1-Fluorenes	µg/Kg	5.0 U
C1-Naphthalenes	µg/Kg	5.0 U
C1-Phenanthrenes/Anthracenes	µg/Kg	5.0 U
C2-Chrysenes	µg/Kg	5.0 U
C2-Fluorenes	µg/Kg	5.0 U
C2-Naphthalenes	µg/Kg	5.0 U
C2-Phenanthrenes/Anthracenes	µg/Kg	5.0 U
C3-Chrysenes	µg/Kg	5.0 U
C3-Fluorenes	µg/Kg	5.0 U
C3-Naphthalenes	µg/Kg	5.0 U
C3-Phenanthrenes/Anthracenes	µg/Kg	5.0 U
C4-Chrysenes	µg/Kg	5.0 U
C4-Naphthalenes	µg/Kg	5.0 U
C4-Phenanthrenes/Anthracenes	µg/Kg	5.0 U
Dibenz(a,h)anthracene	µg/Kg	5.0 U
Fluoranthene	µg/Kg	5.0 U
Fluorene	µg/Kg	5.0 U
Indeno(1,2,3-cd)pyrene	µg/Kg	5.0 U
Naphthalene	µg/Kg	5.0 U
Perylene	µg/Kg	5.0 U
Phenanthrene	µg/Kg	5.0 U
Pyrene	µg/Kg	5.0 U

Table 2-8. Alkylated PAH by SIM Surrogate Results Summary

Lab Sample Number	Field ID	2-Fluorobiphenyl		Nitrobenzene- <i>d</i> ₅		Terphenyl- <i>d</i> ₁₄	
		Limits:	40	120	40	120	40
4056488023	012512115	0 S4		0 S4		0 S4	
4056488108	012712251	0 S4		0 S4		0 S4	
4056488125	012712235	94		84		102	
4056746064	020212535	0 S4		0 S4		0 S4	
4056746069	020212546	0 S4		0 S4		0 S4	
4056746092	020212489	0 S4		0 S4		0 S4	
4056746094	020212496	119		0 S4		0 S4	
4056746258	020812807	0 S4		0 S4		0 S4	
4056900025	021012913	0 S4		0 S4		0 S4	
4056900036	021312932	0 S4		0 S4		0 S4	
4056486021	013012329	0 S4		0 S4		0 S4	

Table 2-9. Alkylated PAH by SIM Laboratory Control Sample Results Summary

Analyte	Recovery Limits (%)		QC Batch: 227746		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	50	125	33.3	17.3	52
Acenaphthene	50	125	33.3	18.3	55
Acenaphthylene	50	125	33.3	18.3	55
Anthracene	50	125	33.3	20.4	61
Benzo(a)anthracene	50	125	33.3	20.3	61
Benzo(a)pyrene	50	125	33.3	20.6	62
Benzo(a,b)fluoranthene	50	125	40	26.3	66
Benzo(e)pyrene	50	125	33.3	21.4	64
Benzo(g,h,i)perylene	50	125	33.3	19.6	59
Benzo(k)fluoranthene	50	125	33.3	20.4	61
Dibenz(a,h)anthracene	50	125	33.3	20.1	60
Fluoranthene	50	125	33.3	21.1	63
Fluorene	50	125	33.3	19.3	58
Indeno(1,2,3-cd)pyrene	50	125	33.3	20.5	61
Naphthalene	50	125	33.3	17.7	53
Perylene	50	125	33.3	20.0	60
Phenanthrene	50	125	33.3	19.7	59
Pyrene	50	125	33.3	22.3	67

Data Validation Report

Project #2069

North Branch/Division Street

**Sediment and aqueous Sample Analyses
Performed by**

**Pace Analytical; Green Bay, Minneapolis and
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Prepared for



Prepared by

SHEPHERD TECHNICAL SERVICES

March 8, 2014

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March 7, 2014

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1.0 INTRODUCTION

All data validation was performed by Shepherd Technical Services following US EPA National Functional Guidelines (NFG), where applicable, using electronic deliverables. Guidance and requirements appearing in the NRT Multi-Site Quality Assurance Project Plan, Rev. 2, 2007 ("Multi-Site QAPP") were also used in the validation process.

Pace Analytical Services, Inc., Green Bay, WI performed the sample analyses on the sediment samples. The Pace Green Bay laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200050). The Pace laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Florida Department of Health Environmental Laboratory Certification Program (ID #E87948).

Pace Analytical Services, Inc., Minneapolis, MN also performed the sample analyses on the sediment samples. The Pace Minneapolis laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200011). The Pace Minneapolis laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Minnesota Department of Health, Environmental Laboratory Accreditation Program (ID # 027-053-137).

TestAmerica Burlington performed analyses for total organic carbon (TOC) and black carbon. The Burlington facility also performed additional analyses for the equipment blanks. The TestAmerica Burlington laboratory holds primary accreditation under the National Environmental Laboratory Accreditation Program (NELAP) by the New Jersey Department of Environmental Protection (ID # VT972).

The laboratories provided all analytical data, including all internal laboratory QC results in an electronic deliverable format.

A total of 296 total sediment samples and 40 aqueous samples (trip blanks, field blanks, equipment blanks, etc.) were collected October 28, 2013 to December 12, 2013 at the North Branch Division Street sites. Upon collection, all samples were held securely prior to shipping to the laboratory. Samples were organized into 37 sample delivery groups (SDGs, or laboratory lot numbers). Samples were analyzed for the indicated parameters using the methods listed in Table 1-1.

The following discrepancies were noted by PACE at sample login;

- Sample 111113041: the container lid was labeled as 111113038; sample was matched by the collection date and time and logged in as 111113041.

The following discrepancies were noted by TestAmerica at sample login;

- COC form for sample 111513208 listed the field ID as 111513208 while the container label showed 111513202. The sample was logged in as per the COC.
- Two sample volumes were received both labeled as 111913276 with different colors and consistencies. The client stated the lighter color sample is 111913274 and the darker color is 111913276.

Table 1-1. PACE Sample/SDG Cross Reference

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
102813264	4087646001	X	X	X	X	X	X	X		X
102813265	4087646002		X	X	X	X	X	X	X	X
102813266	4087646003		X	X	X	X	X	X	X	X
102813273	4087646004		X	X	X	X	X	X	X	X
102813277	4087646005		X	X	X	X	X	X	X	X
102813281	4087646006		X	X	X	X	X	X	X	X
102813282	4087646007	X	X	X	X	X	X	X		X
102813283	4087646008		X	X	X	X	X	X	X	X
102813284	4087646009		X	X	X	X	X	X	X	X
102813287	4087646010		X	X	X	X	X	X	X	X
102813288	4087646011		X	X	X	X	X	X	X	X
102913291	4087646012	X	X	X	X	X	X	X		X
102913292	4087646013		X	X	X	X	X	X	X	X
102913293	4087646014		X	X	X	X	X	X	X	X
102913299	4087646015		X	X	X	X	X	X	X	X
102913300	4087646016	X	X	X	X	X	X	X		X
102913301	4087646017		X	X	X	X	X	X	X	X
102913306	4087646018		X	X	X	X	X	X	X	X
102913308	4087646019	X	X	X	X	X	X	X		X
102913309	4087646020		X	X	X	X	X	X	X	X
102913310	4087646021		X	X	X	X	X	X	X	X
102913313	4087646022		X	X	X	X	X	X	X	X
102913317	4087646023	X	X	X	X	X	X	X		X
102913325	4087646024		X	X	X	X	X	X	X	X
102913327	4087646025	X	X	X	X	X	X	X		X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
102913328	4087646026		X	X	X	X	X	X	X	X
102913329	4087646027		X	X	X	X	X	X	X	X
102913338	4087646028		X	X	X	X	X	X	X	X
102913343	4087646029		X	X	X	X	X	X	X	X
102913348	4087646030		X	X	X	X	X	X	X	X
102913349	4087646031	X	X	X	X	X	X	X		X
102913350	4087646032		X	X	X	X	X	X	X	X
102913351	4087646033		X	X	X	X	X	X	X	X
102913355	4087646034		X	X	X	X	X	X	X	X
102913361	4087646035		X	X	X	X	X	X	X	X
110113375	4088053001	X	X	X	X	X	X	X		X
110113376	4088053002		X	X	X	X	X	X	X	X
110113377	4088053003		X	X	X	X	X	X	X	X
110113380	4088053004		X	X	X	X	X	X	X	X
110113386	4088053005	X	X	X	X	X	X	X		X
110113389	4088053006		X	X	X	X	X	X	X	X
110113390	4088053007		X	X	X	X	X	X	X	X
110113392	4088053008		X	X	X	X	X	X	X	X
110113393	4088053009	X	X	X	X	X	X	X		X
110113394	4088053010		X	X	X	X	X	X	X	X
110113395	4088053011		X	X	X	X	X	X	X	X
110113399	4088053012		X	X	X	X	X	X	X	X
110113406	4088053013		X	X	X	X	X	X	X	X
110113408	4088053014		X	X	X	X	X	X	X	X
110113410	4088053015	X	X	X	X	X	X	X		X
110113411	4088053016		X	X	X	X	X	X	X	X
110113412	4088053017		X	X	X	X	X	X	X	X
110113424	4088053018		X	X	X	X	X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
110113429	4088053019		X	X	X	X	X	X	X	X
110413432	4088053020	X	X	X	X	X	X	X		X
110413433	4088053021		X	X	X	X	X	X	X	X
110413434	4088053022		X	X	X	X	X	X	X	X
110413441	4088053023		X	X	X	X	X	X	X	X
110413443	4088053024		X	X	X	X	X	X	X	X
110413448	4088053025	X	X	X	X	X	X	X		X
110413449	4088053026		X	X	X	X	X	X	X	X
110413450	4088053027		X	X	X	X	X	X	X	X
110413457	4088053028		X	X	X	X	X	X	X	X
110413458	4088053029		X	X	X	X	X	X	X	X
110413460	4088053030		X	X	X	X	X	X	X	X
110413461	4088053031	X	X	X	X	X	X	X		X
110413462	4088053032		X	X	X	X	X	X	X	X
110413463	4088053033		X	X	X	X	X	X	X	X
110413466	4088053034		X	X	X	X	X	X	X	X
110413470	4088053035	X	X	X	X	X	X	X		X
110413471	4088053036		X	X	X	X	X	X	X	X
110813001	4088482001	X	X	X	X		X	X		X
110813002	4088482002		X	X	X		X	X	X	X
110813003	4088482003		X	X	X		X	X	X	X
110813017	4088482004		X	X	X		X	X	X	X
110813019	4088482005	X	X	X	X		X	X		X
110813020	4088482006		X	X	X		X	X	X	X
110813022	4088482007		X						X	
110813504	4088486001	X	X	X	X	X	X	X		X
110813505	4088486002		X	X	X	X	X	X	X	X
110813506	4088486003		X	X	X	X	X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
110813510	4088486004		X	X	X	X	X	X	X	X
110813515	4088486005	X	X	X	X	X	X	X		X
110813517	4088486006		X	X	X	X	X	X	X	X
110813518	4088486007		X	X	X	X	X	X	X	X
111113024	4088482008	X	X	X	X		X	X		X
111113025	4088482009		X	X	X		X	X	X	X
111113026	4088482010		X	X	X		X	X	X	X
111113030	4088482011		X	X	X		X	X	X	X
111113034	4088482012		X	X	X		X	X	X	X
111113038	4088482013		X	X	X		X	X	X	X
111113041	4088482014		X	X	X		X	X	X	X
111213043	4088482015	X	X	X	X		X	X		X
111213044	4088482016		X	X	X		X	X	X	X
111213045	4088482017		X	X	X		X	X	X	X
111213062	4088482018		X	X	X		X	X	X	X
111213063	4088482019		X	X	X		X	X	X	X
111213064	4088482020		X	X	X		X	X	X	X
111313070	4088622001	X	X	X	X		X	X		X
111313071	4088622002		X	X	X		X	X	X	X
111313072	4088622003		X	X	X		X	X	X	X
111313084	4088622004		X	X	X		X	X	X	X
111313085	4088622005	X	X	X	X		X	X		X
111313087	4088622006		X	X	X		X	X	X	X
111313092	4088622007		X	X	X		X	X	X	X
111313095	4088622008		X	X	X		X	X	X	X
111313096	4088622009	X	X	X	X		X	X		X
111313097	4088622010		X	X	X		X	X	X	X
111313098	4088622011		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
111313110	4088622012		X	X	X		X	X	X	X
111313114	4088622013		X	X	X		X	X	X	X
111413118	4088622014	X	X	X	X		X	X		X
111413119	4088622015		X	X	X		X	X	X	X
111413120	4088622016		X	X	X		X	X	X	X
111413134	4088622017		X	X	X		X	X	X	X
111413137	4088622018		X	X	X		X	X	X	X
111413139	4088622019	X	X	X	X		X	X		X
111413140	4088622020		X	X	X		X	X	X	X
111413141	4088622021		X	X	X		X	X	X	X
111413153	4088622022		X	X	X		X	X	X	X
111413154	4088622023	X	X	X	X		X	X		X
111413155	4088622024		X	X	X		X	X	X	X
111513159	4088879001	X	X	X	X		X	X		X
111513160	4088879002		X	X	X		X	X	X	X
111513161	4088879003		X	X	X		X	X	X	X
111513178	4088879004		X	X	X		X	X	X	X
111513179	4088879005		X	X	X		X	X	X	X
111513182	4088879006	X	X	X	X		X	X		X
111513183	4088879007		X	X	X		X	X	X	X
111513184	4088879008		X	X	X		X	X	X	X
111513187	4088879009	X	X	X	X		X	X		X
111513192	4088879010		X	X	X		X	X	X	X
111513193	4088879011		X	X	X		X	X	X	X
111513194	4088879012		X	X	X		X	X	X	X
111513199	4088879013	X	X	X	X		X	X		X
111513200	4088879014		X	X	X		X	X		X
111513201	4088879015		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
111513208	4088879048		X	X	X		X	X	X	X
111813210	4088879016	X	X	X	X		X	X		X
111813211	4088879017		X	X	X		X	X	X	X
111813212	4088879018		X	X	X		X	X	X	X
111813220	4088879019		X	X	X		X	X	X	X
111813221	4088879020		X	X	X		X	X	X	X
111813223	4088879021	X	X	X	X		X	X		X
111813224	4088879022		X	X	X		X	X	X	X
111813225	4088879023		X	X	X		X	X	X	X
111813235	4088879024	X	X	X	X		X	X		X
111813236	4088879025		X	X	X		X	X	X	X
111813237	4088879026		X	X	X		X	X	X	X
111813239	4088879027	X	X	X	X		X	X		X
111813240	4088879028		X	X	X		X	X	X	X
111813241	4088879029		X	X	X		X	X	X	X
111813251	4088879030		X	X	X		X	X	X	X
111813252	4088879031		X	X	X		X	X	X	X
111813258	4088879032		X	X	X		X	X	X	X
111913260	4088879033	X	X	X	X		X	X		X
111913261	4088879034		X	X	X		X	X	X	X
111913262	4088879035		X	X	X		X	X	X	X
111913274	4088879036		X	X	X		X	X	X	X
111913276	4088879037		X	X	X		X	X	X	X
111913279	4088879038	X	X	X	X		X	X		X
111913280	4088879039		X	X	X		X	X	X	X
111913281	4088879040		X	X	X		X	X	X	X
111913292	4088879041		X	X	X		X	X	X	X
111913293	4088879042		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
111913298	4088879043	X	X	X	X		X	X		X
111913299	4088879044		X	X	X		X	X	X	X
111913300	4088879045		X	X	X		X	X	X	X
111913305	4088879046		X	X	X		X	X	X	X
111913307	4088879047		X	X	X		X	X	X	X
112013310	4089023001	X	X	X	X		X	X		X
112013311	4089023002		X	X	X		X	X	X	X
112013312	4089023003		X	X	X		X	X	X	X
112013318	4089023004		X	X	X		X	X	X	X
112013327	4089023005	X	X	X	X		X	X		X
112013328	4089023006		X	X	X		X	X	X	X
112013331	4089023007	X	X	X	X		X	X		X
112013332	4089023008		X	X	X		X	X	X	X
112013333	4089023009		X	X	X		X	X	X	X
112013340	4089023010		X	X	X		X	X	X	X
112013343	4089023011		X	X	X		X	X	X	X
112013344	4089023012		X	X	X		X	X	X	X
112013346	4089023013	X	X	X	X		X	X		X
112013347	4089023014		X	X	X		X	X	X	X
112013348	4089023015		X	X	X		X	X	X	X
112013358	4089023016		X	X	X		X	X	X	X
112013364	4089023017		X	X	X		X	X	X	X
112113366	4089023018	X	X	X	X		X	X		X
112113367	4089023019		X	X	X		X	X	X	X
112113368	4089023020		X	X	X		X	X	X	X
112113371	4089023021		X	X	X		X	X	X	X
112113382	4089023022		X	X	X		X	X	X	X
112113383	4089023023		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
112113385	4089023024	X	X	X	X		X	X		X
112113386	4089023025		X	X	X		X	X	X	X
112113387	4089023026		X	X	X		X	X	X	X
112113389	4089023027		X	X	X		X	X	X	X
112113399	4089023028		X	X	X		X	X	X	X
112113400	4089023029		X	X	X		X	X	X	X
112213406	4089202001	X	X	X	X		X	X		X
112213407	4089202002		X	X	X		X	X	X	X
112213408	4089202003		X	X	X		X	X	X	X
112213422	4089202004		X	X	X		X	X	X	X
112213423	4089202005		X	X	X		X	X	X	X
112213424	4089202006		X	X	X		X	X	X	X
112213425	4089202007	X	X	X	X		X	X		X
112213426	4089202008		X	X	X		X	X	X	X
112213427	4089202009		X	X	X		X	X	X	X
112213443	4089202010		X	X	X		X	X	X	X
112213444	4089202011		X	X	X		X	X	X	X
112213446	4089202012		X	X	X		X	X	X	X
112213447	4089202013	X	X	X	X		X	X		X
112213448	4089202014		X	X	X		X	X	X	X
112213449	4089202015		X	X	X		X	X	X	X
112213450	4089202016		X	X	X		X	X	X	X
112513452	4089202017	X	X	X	X		X	X		X
112513453	4089202018		X	X	X		X	X	X	X
112513454	4089202019		X	X	X		X	X	X	X
112513466	4089202020	X	X	X	X		X	X		X
112513467	4089202021		X	X	X		X	X	X	X
112513468	4089202022		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
112513469	4089202023		X	X	X		X	X	X	X
112513473	4089202024	X	X	X	X		X	X		X
112513474	4089202025		X	X	X		X	X	X	X
112513475	4089202026		X	X	X		X	X	X	X
112513485	4089202027		X	X	X		X	X	X	X
112513486	4089202028		X	X	X		X	X	X	X
112513486	4089362001	X	X	X	X		X	X		X
112613491	4089362002		X	X	X		X	X	X	X
112613492	4089362003		X	X	X		X	X	X	X
112613503	4089362004	X	X	X	X		X	X		X
112613504	4089362005		X	X	X		X	X	X	X
112613505	4089362006		X	X	X		X	X	X	X
112613506	4089362007		X	X	X		X	X	X	X
112613517	4089362008		X	X	X		X	X	X	X
120213522	4089509001	X	X	X	X		X	X		X
120213523	4089509002		X	X	X		X	X	X	X
120213524	4089509003		X	X	X		X	X	X	X
120213532	4089509004		X	X	X		X	X	X	X
120213535	4089509005		X	X	X		X	X	X	X
120213545	4089509006	X	X	X	X		X	X		X
120213546	4089509007		X	X	X		X	X	X	X
120213547	4089509008		X	X	X		X	X	X	X
120213557	4089509009		X	X	X		X	X	X	X
120213558	4089509010		X	X	X		X	X	X	X
120213559	4089509011	X	X	X	X		X	X		X
120213560	4089509012		X	X	X		X	X	X	X
120213570	4089509013		X	X	X		X	X	X	X
120313572	4089509014	X	X	X	X		X	X		X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
120313573	4089509015		X	X	X		X	X	X	X
120313574	4089509016		X	X	X		X	X	X	X
120313581	4089509017		X	X	X		X	X	X	X
120313582	4089509018		X	X	X		X	X	X	X
120313588	4089509019	X	X	X	X		X	X		X
120313589	4089509020		X	X	X		X	X	X	X
120313590	4089509021		X	X	X		X	X	X	X
120313602	4089509022		X	X	X		X	X	X	X
120313603	4089509023	X	X	X	X		X	X		X
120313604	4089509024		X	X	X		X	X	X	X
120413617	4089665001	X	X	X	X		X	X		X
120413618	4089665002		X	X	X		X	X	X	X
120413619	4089665003		X	X	X		X	X	X	X
120413629	4089665004		X	X	X		X	X	X	X
120413630	4089665005		X	X	X		X	X	X	X
120413632	4089665006		X	X	X		X	X	X	X
120413633	4089665007	X	X	X	X		X	X		X
120413634	4089665008		X	X	X		X	X	X	X
120413635	4089665009		X	X	X		X	X	X	X
120413641	4089665010		X	X	X		X	X	X	X
120413642	4089665011		X	X	X		X	X	X	X
120413645	4089665012	X	X	X	X		X	X		X
120413646	4089665013		X	X	X		X	X	X	X
120413653	4089665014		X	X	X		X	X	X	X
120413654	4089665015		X	X	X		X	X	X	X
120613845	4089818001	X	X	X	X		X	X		X
120613846	4089818002		X	X	X		X	X	X	X
120613847	4089818003		X	X	X		X	X	X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012
120613851	4089818004		X	X	X		X	X	X	X
120613859	4089818005		X	X	X		X	X	X	X
120613860	4089818006		X	X	X		X	X	X	X

Table 1-2. TestAmerica Sample/SDG Cross Reference

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
102813262	200-19227-36	X	X	X	X	X	X	X			
102813263	200-19227-37				X						
102813264	200-19227-1								X	X	X
102813265	200-19227-2									X	X
102813266	200-19227-3									X	X
102813273	200-19227-4									X	X
102813277	200-19227-5									X	X
102813281	200-19227-6									X	X
102813282	200-19227-7								X	X	X
102813283	200-19227-8									X	X
102813284	200-19227-9									X	X
102813287	200-19227-10									X	X
102813288	200-19227-11									X	X
102913290	200-19227-38	X	X	X	X	X	X	X			
102913291	200-19227-12								X	X	X
102913292	200-19227-13									X	X
102913293	200-19227-14									X	X
102913299	200-19227-15									X	X
102913300	200-19227-16								X	X	X
102913301	200-19227-17									X	X
102913306	200-19227-18									X	X
102913308	200-19227-19								X	X	X
102913309	200-19227-20									X	X
102913310	200-19227-21									X	X
102913313	200-19227-22									X	X
102913317	200-19227-23								X	X	X
102913325	200-19227-24									X	X
102913327	200-19227-25								X	X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
102913328	200-19227-26									X	X
102913329	200-19227-27									X	X
102913338	200-19227-28									X	X
102913343	200-19227-29									X	X
102913348	200-19227-30									X	X
102913349	200-19227-31								X	X	X
102913350	200-19227-32									X	X
102913351	200-19227-33									X	X
102913355	200-19227-34									X	X
102913361	200-19227-35									X	X
103013363	200-19267-1	X	X	X	X	X	X	X			
103013364	200-19267-2				X						
110113373	200-19364-1	X	X	X	X	X	X	X			
110113374	200-19364-2				X						
110113375	200-19364-5								X	X	X
110113376	200-19364-6									X	X
110113377	200-19364-7									X	X
110113380	200-19364-8									X	X
110113386	200-19364-9								X	X	X
110113389	200-19364-10									X	X
110113390	200-19364-11									X	X
110113392	200-19364-12									X	X
110113393	200-19364-13								X	X	X
110113394	200-19364-14									X	X
110113395	200-19364-15									X	X
110113399	200-19364-16									X	X
110113406	200-19364-17									X	X
110113408	200-19364-18									X	X
110113410	200-19364-19								X	X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
110113411	200-19364-20									X	X
110113412	200-19364-21									X	X
110113424	200-19364-22									X	X
110113429	200-19364-23									X	X
110413431	200-19364-3	X	X	X	X	X	X	X			
110413432	200-19364-24								X	X	X
110413433	200-19364-25									X	X
110413434	200-19364-26									X	X
110413441	200-19364-27									X	X
110413443	200-19364-28									X	X
110413448	200-19364-29								X	X	X
110413449	200-19364-30									X	X
110413450	200-19364-31									X	X
110413457	200-19364-32									X	X
110413458	200-19364-33									X	X
110413460	200-19364-34									X	X
110413461	200-19364-35								X	X	X
110413462	200-19364-36									X	X
110413463	200-19364-37									X	X
110413466	200-19364-38									X	X
110413470	200-19364-39								X	X	X
110413471	200-19364-40									X	X
110513474	200-19364-4	X	X	X	X	X	X	X			
110713490	200-19434-1	X	X	X	X	X	X	X			
110713491	200-19434-2				X						
110813001	200-19557-5								X	X	X
110813002	200-19557-6									X	X
110813003	200-19557-7									X	X
110813017	200-19557-8									X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
110813019	200-19557-9								X	X	X
110813020	200-19557-10									X	X
110813502	200-19557-1	X	X	X	X	X	X	X			
110813503	200-19557-2				X						
110813504	200-19557-24								X	X	X
110813505	200-19557-25									X	X
110813506	200-19557-26									X	X
110813510	200-19557-27									X	X
110813515	200-19557-28								X	X	X
110813517	200-19557-29									X	X
110813518	200-19557-30									X	X
111113023	200-19557-3	X	X		X	X	X	X			
111113024	200-19557-11								X	X	X
111113025	200-19557-12									X	X
111113026	200-19557-13									X	X
111113030	200-19557-14									X	X
111113034	200-19557-15									X	X
111113038	200-19557-16									X	X
111113041	200-19557-17									X	X
111213042	200-19557-4	X	X		X	X	X	X			
111213043	200-19557-18								X	X	X
111213044	200-19557-19									X	X
111213045	200-19557-20									X	X
111213062	200-19557-21									X	X
111213063	200-19557-22									X	X
111213064	200-19557-23									X	X
111313070	200-19575-4								X	X	X
111313071	200-19575-5									X	X
111313072	200-19575-6									X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
111313084	200-19575-7									X	X
111313085	200-19575-8								X	X	X
111313087	200-19575-9									X	X
111313092	200-19575-10									X	X
111313095	200-19575-11									X	X
111313096	200-19575-12								X	X	X
111313097	200-19575-13									X	X
111313098	200-19575-14									X	X
111313110	200-19575-15									X	X
111313114	200-19575-27									X	X
111413118	200-19575-16								X	X	X
111413119	200-19575-17									X	X
111413120	200-19575-18									X	X
111413134	200-19575-19									X	X
111413137	200-19575-20									X	X
111413139	200-19575-21								X	X	X
111413140	200-19575-22									X	X
111413141	200-19575-23									X	X
111413153	200-19575-24									X	X
111413154	200-19575-25								X	X	X
111413155	200-19575-26									X	X
111513157	200-19664-1	X	X		X	X	X	X			
111513158	200-19664-2				X						
111513159	200-19664-5								X	X	X
111513160	200-19664-6									X	X
111513161	200-19664-7									X	X
111513178	200-19664-8									X	X
111513179	200-19664-9									X	X
111513182	200-19664-10								X	X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
111513183	200-19664-11									X	X
111513184	200-19664-12									X	X
111513187	200-19664-13								X	X	X
111513192	200-19664-14									X	X
111513193	200-19664-15									X	X
111513194	200-19664-16									X	X
111513199	200-19664-17								X	X	X
111513200	200-19664-18									X	X
111513201	200-19664-19									X	X
111513208	200-19664-52									X	X
111813209	200-19664-3	X	X		X	X	X	X			
111813210	200-19664-21								X	X	X
111813211	200-19664-22									X	X
111813212	200-19664-23									X	X
111813220	200-19664-24									X	X
111813221	200-19664-25									X	X
111813223	200-19664-26								X	X	X
111813224	200-19664-27									X	X
111813225	200-19664-28									X	X
111813235	200-19664-29								X	X	X
111813236	200-19664-30									X	X
111813237	200-19664-31									X	X
111813239	200-19664-32								X	X	X
111813240	200-19664-33									X	X
111813241	200-19664-34									X	X
111813251	200-19664-35									X	X
111813252	200-19664-36									X	X
111813258	200-19664-37									X	X
111913259	200-19664-4	X	X		X	X	X	X			

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
111913260	200-19664-38								X	X	X
111913261	200-19664-39									X	X
111913262	200-19664-40									X	X
111913274	200-19664-53									X	X
111913276	200-19664-41									X	X
111913279	200-19664-42								X	X	X
111913280	200-19664-43									X	X
111913281	200-19664-44									X	X
111913292	200-19664-45									X	X
111913293	200-19664-46									X	X
111913298	200-19664-47								X	X	X
111913299	200-19664-48									X	X
111913300	200-19664-49									X	X
111913305	200-19664-50									X	X
111913307	200-19664-51									X	X
112013308	200-19709-1	X	X		X	X	X	X			
112013309	200-19709-2				X						
112013310	200-19709-4								X	X	X
112013311	200-19709-5									X	X
112013312	200-19709-6									X	X
112013318	200-19709-7									X	X
112013327	200-19709-8								X	X	X
112013328	200-19709-9									X	X
112013331	200-19709-10								X	X	X
112013332	200-19709-11									X	X
112013333	200-19709-12									X	X
112013340	200-19709-13									X	X
112013343	200-19709-14									X	X
112013344	200-19709-15									X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
112013346	200-19709-16								X	X	X
112013347	200-19709-17									X	X
112013348	200-19709-18									X	X
112013358	200-19709-19									X	X
112013364	200-19709-20									X	X
112113365	200-19709-3	X	X		X	X	X	X			
112113366	200-19709-21								X	X	X
112113367	200-19709-22									X	X
112113368	200-19709-23									X	X
112113371	200-19709-24									X	X
112113382	200-19709-25									X	X
112113383	200-19709-26									X	X
112113385	200-19709-27								X	X	X
112113386	200-19709-28									X	X
112113387	200-19709-29									X	X
112113389	200-19709-30									X	X
112113399	200-19709-31									X	X
112113400	200-19709-32									X	X
112213404	200-19777-1	X	X		X	X	X	X			
112213405	200-19777-2				X						
112213406	200-19777-4								X	X	X
112213407	200-19777-5									X	X
112213408	200-19777-6									X	X
112213422	200-19777-7									X	X
112213423	200-19777-8									X	X
112213424	200-19777-9									X	X
112213425	200-19777-10								X	X	X
112213426	200-19777-11									X	X
112213427	200-19777-12									X	X

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
112213443	200-19777-13									X	X
112213444	200-19777-14									X	X
112213446	200-19777-15									X	X
112213447	200-19777-16								X	X	X
112213448	200-19777-17									X	X
112213449	200-19777-18									X	X
112213450	200-19777-19									X	X
112513451	200-19777-3	X	X		X	X	X	X			
112513452	200-19777-20								X	X	X
112513453	200-19777-21									X	X
112513454	200-19777-22									X	X
112513466	200-19777-23								X	X	X
112513467	200-19777-24									X	X
112513468	200-19777-25									X	X
112513469	200-19777-26									X	X
112513473	200-19777-27								X	X	X
112513474	200-19777-28									X	X
112513475	200-19777-29									X	X
112513485	200-19777-30									X	X
112513486	200-19777-31									X	X
112613490	200-19822-1								X	X	X
112613491	200-19822-2									X	X
112613492	200-19822-3									X	X
112613503	200-19822-4								X	X	X
112613504	200-19822-5									X	X
112613505	200-19822-6									X	X
112613506	200-19822-7									X	X
112613517	200-19822-8									X	X
120213518	200-19822-9	X	X		X	X	X	X			

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
120213519	200-19822-10				X						
120213520	200-19876-1	X	X		X	X	X	X			
120213521	200-19876-2				X						
120213522	200-19876-4								X	X	X
120213523	200-19876-5									X	X
120213524	200-19876-6									X	X
120213532	200-19876-7									X	X
120213535	200-19876-8									X	X
120213545	200-19876-9								X	X	X
120213546	200-19876-10									X	X
120213547	200-19876-11									X	X
120213557	200-19876-12									X	X
120213558	200-19876-13									X	X
120213559	200-19876-14								X	X	X
120213560	200-19876-15									X	X
120213570	200-19876-16									X	X
120313571	200-19876-3	X	X		X	X	X	X			
120313572	200-19876-17								X	X	X
120313573	200-19876-18									X	X
120313574	200-19876-19									X	X
120313581	200-19876-20									X	X
120313582	200-19876-21									X	X
120313588	200-19876-22								X	X	X
120313589	200-19876-23									X	X
120313590	200-19876-24									X	X
120313602	200-19876-25									X	X
120313603	200-19876-26								X	X	X
120313604	200-19876-27									X	X
120413615	200-19939-1	X	X		X	X	X	X			

Field ID	Lab Sample ID	6020A	7470A	8082A	8260B	8270C SIM	8270D	9012B	Lloyd Kahn-BC	Lloyd Kahn-TOC	Moisture
120413616	200-19939-2				X						
120413617	200-19939-4								X	X	X
120413618	200-19939-5									X	X
120413619	200-19939-6									X	X
120413629	200-19939-7									X	X
120413630	200-19939-8									X	X
120413632	200-19939-9									X	X
120413633	200-19939-10								X	X	X
120413634	200-19939-11									X	X
120413635	200-19939-12									X	X
120413641	200-19939-13									X	X
120413642	200-19939-14									X	X
120413645	200-19939-15								X	X	X
120413646	200-19939-16									X	X
120413653	200-19939-17									X	X
120413654	200-19939-18									X	X
120513657	200-19939-3	X	X		X	X	X	X			
120613843	200-20035-1	X	X	X	X	X		X			
120613844	200-20035-2				X						
120613845	200-20035-4								X	X	X
120613846	200-20035-5									X	X
120613847	200-20035-6									X	X
120613851	200-20035-7									X	X
120613859	200-20035-8									X	X
120613860	200-20035-9									X	X
120913863	200-20035-3					X					
121013867	200-20074-1					X					
121113524	200-20074-2					X					

2.0 INORGANIC DATA REVIEW

2.1 Summary

Blank, spiked, and duplicate results were provided. Overall, QC data indicated acceptable precision and accuracy. The results of the QC review are presented below.

2.2 Sample Receipt and Methodology

The sediment samples were analyzed for inorganic parameters following the methods cited in Table 2-1.

Table 2-1. Sediment Inorganic Analytes and Methods Summary

<i>Analytical Method</i>	<i>Analyte</i>
EPA 6020	Metals
EPA 7470/7471	Mercury
EPA 9012	Cyanide
ASTM D2974-87	Percent Moisture
Lloyd Kahn BC	Black Carbon
Lloyd Kahn TOC	Total Organic Carbon

Generally, the samples arrived at the laboratories properly preserved and in good condition. Some of the samples were held in the field for one or two days prior to delivery to the laboratory. Most samples were analyzed within the prescribed holding times, where holding times have been defined. A few of the Total Organic Carbon (TOC) samples were reanalyzed outside of the holding time. Samples 111413154, 111513155, 111513159, 111513194, 111513199, 111513200, and 111513208 fall into this category and all will be qualified as estimated ("J") for TOC.

2.3 Blanks

The initial and continuing calibration blanks (ICBs/CCBs) for ICP/MS metals on many occasions gave values above the limit of detection but below the reporting limit (limit of quantitation) for some of the elements. All of the calibration blank values are well below the reporting limit with the exception of one copper value that is above the reporting limit. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

The initial and continuing calibration blanks (ICBs/CCBs) for mercury on occasion gave values above the limit of detection but below the reporting limit (limit of quantitation). All of the calibration blank values are well below the reporting limit.

The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified

The initial and continuing calibration blanks (ICBs/CCBs) for cyanide on occasion gave values above the limit of detection but below the reporting limit (limit of quantitation). All of the calibration blank values are well below the reporting limit. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified

The initial and continuing calibration blanks (ICBs/CCBs) for Total Organic Carbon and Black Carbon in many cases gave results above the reporting limit. However, in all cases the measured values in the blanks were at least an order of magnitude lower than measured values in the samples. Therefore, no data are qualified as a consequence of the calibration blank data.

Method blanks were prepared for each batch of samples prepared for analysis for each method.

Several batches had some elements detected in the method blanks that were above the limited of detection but below the reporting limit for Method 6020. Those affected batches and elements are detailed in the method blank tables below. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

One method blank for total cyanide gave a positive value between the limit of detection and the reporting limit. The affected batch is detailed in the method blank tables below. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

A few of the method blanks for mercury gave positive values between the limit of detection and the reporting limit. Those affected batches and elements are detailed in the method blank tables below. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

Method blanks for black carbon gave no positive values above the reporting limit. Many of the method blanks for total organic carbon gave a positive value between the limit of detection and the reporting limit. All sample values are considerably more than ten times the detected contamination level reported. No results will be qualified based on the levels detected in the samples.

Twenty-three equipment blanks were submitted for analysis. Overall most equipment blanks showed some level of contamination for metals. Most of the observed values were between the detection limit and the reporting limit. The effected sediment sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

The method blank results are summarized in Tables 2-2 through 2-9.

Table 2-2. Sediment Method 6020 Blank Results Summary (mg/Kg)

Parameter	QC Batch: 146599	QC Batch: 146600	QC Batch: 146601	QC Batch: 147110	QC Batch: 147237	QC Batch: 147364	QC Batch: 147524
Aluminum	1.7 U	2.0 J	1.7 U				
Antimony	0.0069 U						
Arsenic	0.014 U						
Barium	0.039 U						
Cadmium	0.013 U						
Chromium	0.025 J	0.028 J	0.045 J	0.043 J	0.046 J	0.024 J	0.023 U
Copper	0.026 J	0.026 J	0.023 U	0.023 U	0.030 J	0.023 U	0.023 U
Iron	5.7 U						
Lead	0.021 J	0.0084 U	0.0087 J	0.010 J	0.018 J	0.0084 U	0.0084 U
Manganese	0.028 U	0.035 J	0.037 J	0.028 U	0.039 J	0.035 J	0.028 U
Nickel	0.016 U	0.016 U	0.053 J	0.027 J	0.020 J	0.017 J	0.016 U
Selenium	0.031 U						
Silver	0.0026 U						
Vanadium	0.023 U						
Zinc	0.58 U						

Table 2-2. Sediment Method 6020 Blank Results Summary (mg/Kg) Cont 1

Parameter	QC Batch: 147705	QC Batch: 148095	QC Batch: 148447	QC Batch: 148449	QC Batch: 148608	QC Batch: 148929
Aluminum	1.7 U	1.7 U	1.9 J	2.3 J	1.7 U	2.7 J
Antimony	0.0069 U					
Arsenic	0.014 U					
Barium	0.039 U					
Cadmium	0.013 U					
Chromium	0.023 U	0.027 J	0.080 J	0.032 J	0.032 J	0.038 J
Copper	0.078 J	0.023 U	0.093 J	0.023 U	0.075 J	0.023 U
Iron	5.7 U					
Lead	0.0084 U	0.0084 U	0.0085 J	0.019 J	0.0084 U	0.0084 J
Manganese	0.028 U	0.028 U	0.034 J	0.031 J	0.028 U	0.028 U
Nickel	0.016 U	0.017 J	0.062 J	0.017 J	0.016 U	0.019 J
Selenium	0.031 U					
Silver	0.0026 U					
Vanadium	0.023 U					
Zinc	0.58 U					

Table 2-2. Sediment Method 6020 Blank Results Summary (mg/Kg) Cont 2

Parameter	QC Batch: 148954	QC Batch: 149116	QC Batch: 149117	QC Batch: 149323	QC Batch: 149344	QC Batch: 150029
Aluminum	2.3 J	3.1 J	1.8 J	4.9 J	3.9 J	8.5 J
Antimony	0.0069 U					
Arsenic	0.014 U					
Barium	0.039 U					
Cadmium	0.013 U					
Chromium	0.033 J	0.10	0.033 J	0.044 J	0.036 J	0.025 J
Copper	0.084 J	0.023 U	0.023 U	0.024 J	0.023 U	0.031 J
Iron	5.7 U	6.6 J	5.7 U	5.7 U	5.7 U	5.7 U
Lead	0.012 J	0.012 J	0.0084 J	0.016 J	0.030 J	0.011 J
Manganese	0.028 U	0.057 J	0.028 U	0.028 U	0.028 U	0.028 U
Nickel	0.016 U	0.021 J	0.018 J	0.029 J	0.016 U	0.017 J
Selenium	0.031 U					
Silver	0.0026 U					
Vanadium	0.023 U					
Zinc	0.58 U					

Table 2-3. Water Method 6020 Method Blank Results Summary (µg/L)

<i>Parameter</i>	<i>QC Batch: 200-63833</i>	<i>QC Batch: 200-64333</i>	<i>QC Batch: 200-64891</i>	<i>QC Batch: 200-65650</i>	<i>QC Batch: 200-66515</i>	<i>QC Batch: 200-66579</i>
Aluminum	6.0 U	6.0 U	6.0 U	6.12 J	6.0 U ^	9.51 J
				6.90 J		6.0 U
				7.28 J		6.0 U
Antimony	0.073 U	0.073 U	0.073 U	0.073 U	0.327 J	0.073 U
				0.109 J		0.073 U
				0.073 U		
Arsenic	0.092 U	0.289 J	0.092 U	0.092 U	0.092 U	0.092 U
				0.092 U		0.092 U
Barium	0.42 U					
				0.42 U		0.42 U
Cadmium	0.046 U					
				0.046 U		0.046 U
Chromium	0.11 U	0.11 U	0.11 U	0.517 J	2.35 J	0.300 J
				0.968 J		0.11 U
				0.299 J		
Copper	0.23 U	0.23 U	1.27 J	1.45 J	0.23 U	0.321 J
				0.468 J		0.232 J
				0.391 J		
Iron	8.3 U	8.3 U	72.00 J	9.98 J	8.3 U	8.3 U
				8.3 U		8.3 U
				8.3 U		
Lead	0.024 U	0.024 U	0.024 U	0.0820 J	0.024 U	0.0270 J
				0.0550 J		0.106 J
				0.0250 J		
Manganese	1.0 U					
				1.0 U		1.0 U
				1.0 U		
Nickel	0.63 U					
				0.63 U		0.63 U
				0.63 U		
Selenium	0.347 J	0.594 J	0.32 U ^	0.364 J	0.420 J	0.32 U ^
				0.32 U		0.32 U ^
				0.32 U		
Silver	0.014 U					
				0.0170 J		0.014 U
				0.014 U		
Vanadium	0.30 U	0.30 U	0.30 U	0.30 U	0.925 J	0.30 U
				0.30 U		0.30 U
				0.30 U		
Zinc	1.00 J	9.23 J	2.87 J	2.13 J	2.72 J	12.05 J
				2.89 J		2.25 J
				2.51 J		

Table 2-4. Sediment Method 7471 Blank Results Summary (mg/Kg)

Parameter	Batch	Result
Mercury	146042	0.0033 U
	146198	0.0033 U
	146526	0.0033 U
	146527	0.0033 U
	147350	0.0033 U
	147565	0.0033 U
	147672	0.0033 U
	147673	0.0033 U
	147674	0.0033 U
	148769	0.0033 U
	148770	0.0033 U
	148921	0.0033 U
	148925	0.0033 U
	149143	0.0033 U
	149346	0.0033 U
	149526	0.0033 U
	149806	0.0033 U
	149809	0.0033 U
	149968	0.0033 U
	150204	0.0033 U
150444	0.0033 U	
150831	0.0033 U	

Table 2-5. Water Method 7470 Method Blank Results Summary (µg/L)

Parameter	Batch	Result
Mercury	200-63737	0.050 U
	200-64789	0.050 U
	200-64995	0.050 U
	200-65197	0.0710 J
		0.0640 J
	200-65612	0.050 U
	200-65936	0.0870 J
	200-66217	0.050 U

Table 2-6. Sediment Method 9012 Blank Results Summary (mg/Kg)

Parameter	Batch	Result
Cyanide	146543	0.19 U
	146544	0.27 J
	146545	0.19 U
	146990	0.19 U
	146991	0.19 U
	146992	0.19 U
	147509	0.19 U
	147914	0.19 U
	147915	0.19 U
	147916	0.19 U
	148014	0.19 U
	148549	0.19 U
	148550	0.19 U
	148648	0.19 U
	149050	0.19 U
	149052	0.19 U
	149175	0.19 U
	149987	0.19 U
	150104	0.19 U
	150149	0.19 U
150150	0.19 U	

Table 2-7. Water Method 9012 Method Blank Results Summary (µg/L)

Parameter	Batch	Result
Cyanide, Total	200-64176	1.6 U
	200-64328	1.6 U
	200-64895	1.6 U
	200-65492	1.6 U
	200-65925	1.6 U
	200-66376	1.6 U

Table 2-8. Sediment Lloyd Kahn TOC Blank Results Summary (mg/Kg)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Total Organic Carbon	200-63842	109 U
	200-63939	177.5 J
	200-64178	109 U
	200-64416	300.0 J
	200-64422	149.0 J
	200-64542	155.0 J
	200-64851	125.0 J
		109 U
	200-64918	109 U
	200-65183	145.0 J
	200-65293	385.0 J
	200-65384	400.0 J
	200-65439	565.0 J ^
	200-65517	365.0 J
	200-65584	380.0 J
	200-65663	380.0 J
	200-65706	375.0 J
	200-65760	109 U
	200-65840	109 U
	200-65894	185.0 J
200-65961	109 U	
200-66047	109 U	
200-66190	109 U	

Table 2-9. Sediment Lloyd Kahn Black Carbon Blank Results Summary (mg/Kg)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Black Carbon	200-63898	1000 U
	200-64539	1000 U
	200-65585	1000 U
	200-65841	1000 U
	200-66350	1000 U

2.4 Calibration

Initial instrument calibrations for each of the methods were all within acceptance criteria.

2.4.1 Calibration Verification: Sediment Sample Analyses

Initial instrument calibrations for each of the methods were all well within acceptance criteria. All parameters were calibrated using multi-point curves with appropriate first order regression models applied.

All of the initial calibration verification checks (ICVs) for these analyses met the stated $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the initial calibration verification data.

There was a single instance where the low level calibration verification checks ("CCVLs") performed for these analyses did not meet the $\pm 30\%$ acceptance criterion used by the laboratory and required by the methods. Copper failed at 142%. All associated samples with levels below the CCV value ($100\mu\text{g/L}$) were reported from a different analysis. No data is qualified based on the CCVL.

The laboratory also performed the requisite interference checks (ICS A, ICS AB) with each calibration. All of the interference checks gave acceptable results. Hence, no data are qualified as a consequence of the interference check sample data.

Continuing calibration verification checks were performed at the required frequencies. All of the continuing calibration verification checks (CCVs) for these analyses met the $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the continuing calibration data.

2.4.2 Equipment Blanks Calibration Verification

There were a few instances where the calibration verification checks (ICV/CCVs) performed for these analyses did not meet the $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. Aluminum failed at 89% for the analysis sequence containing samples 120413615 and 120513657. Since all the failures are below the specified limits, the samples will be qualified as estimated with a potential low bias ("J-"). In a single instance the CCV result for selenium exceeded the CCV limit of $\pm 10\%$ at 116% and 113%. Since no selenium was detected in the associated samples, no data will be qualified.

2.5 Laboratory Control Samples

Laboratory control samples (LCS) were analyzed with each of the data sets. The recovery limits used by the laboratory for LCS results are either those given in the method guidance or are based upon laboratory performance. Some of the laboratory control samples were prepared and analyzed multiple times. All results from all analyses are reported. All recoveries for all analytes/all methods were within the specified limits. No data are qualified as a consequence of the LCS results.

Recoveries are given along with the acceptance limits in Tables 2-10 through 2-17.

Table 2-10. Sediment Method 6020 LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 146599			QC Batch: 146600			QC Batch: 146601		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	80	120	500	495	99	500	504	101	500	502	100
Antimony	80	120	50	51.0	102	50	52.0	104	50	52.5	105
Arsenic	80	120	50	50.3	101	50	50.2	100	50	52.6	105
Barium	80	120	50	49.4	99	50	50.3	101	50	48.5	97
Cadmium	80	120	50	52.0	104	50	51.7	103	50	50.4	101
Chromium	80	120	50	48.7	97	50	49.3	99	50	49.2	98
Copper	80	120	50	49.6	99	50	49.9	100	50	49.8	100
Iron	80	120	500	489	98	500	500	100	500	502	100
Lead	80	120	50	48.4	97	50	48.6	97	50	48.4	97
Manganese	80	120	50	48.2	96	50	48.8	98	50	48.9	98
Nickel	80	120	50	49.3	99	50	49.6	99	50	50.9	102
Selenium	80	120	50	52.1	104	50	52.0	104	50	53.3	107
Silver	80	120	25	24.7	99	25	25.3	101	25	24.7	99
Vanadium	80	120	50	48.6	97	50	48.9	98	50	49.0	98
Zinc	80	120	50	50.5	101	50	51.0	102	50	53.9	108

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 1

Parameter	QC Batch: 147110			QC Batch: 147237			QC Batch: 147364		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	487	97	500	505	101	500	502	100
Antimony	50	51.6	103	50	52.0	104	50	51.8	104
Arsenic	50	50.4	101	50	50.2	100	50	51.2	102
Barium	50	49.6	99	50	49.3	99	50	49.3	99
Cadmium	50	52.4	105	50	52.1	104	50	51.4	103
Chromium	50	49.9	100	50	49.2	98	50	49.7	99
Copper	50	50.8	102	50	49.8	100	50	50.2	100
Iron	500	507	101	500	504	101	500	502	100
Lead	50	51.6	103	50	50.0	100	50	52.1	104
Manganese	50	49.2	98	50	49.9	100	50	48.9	98
Nickel	50	50.6	101	50	49.3	99	50	50.1	100
Selenium	50	51.2	102	50	54.3	109	50	51.6	103
Silver	25	25.3	101	25	24.4	98	25	24.9	100
Vanadium	50	50.0	100	50	49.1	98	50	49.4	99
Zinc	50	51.9	104	50	52.9	106	50	52.3	105

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 2

Parameter	QC Batch: 147524			QC Batch: 147705			QC Batch: 148095		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	501	100	500	487	97	500	483	97
Antimony	50	50.9	102	50	50.4	101	50	51.8	104
Arsenic	50	50.8	102	50	49.6	99	50	50.1	100
Barium	50	49.5	99	50	49.0	98	50	49.4	99
Cadmium	50	49.7	99	50	49.1	98	50	50.5	101
Chromium	50	48.7	97	50	48.5	97	50	49.2	98
Copper	50	48.2	96	50	47.5	95	50	49.1	98
Iron	500	499	100	500	486	97	500	490	98
Lead	50	47.6	95	50	48.1	96	50	53.0	106
Manganese	50	49.4	99	50	48.8	98	50	48.9	98
Nickel	50	49.2	98	50	48.5	97	50	49.5	99
Selenium	50	54.6	109	50	52.5	105	50	50.7	101
Silver	25	24.0	96	25	24.2	97	25	24.5	98
Vanadium	50	48.6	97	50	48.4	97	50	49.2	98
Zinc	50	51.0	102	50	49.6	99	50	51.6	103

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 3

Parameter	QC Batch: 148447			QC Batch: 148449			QC Batch: 148608		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	500	100	500	499	100	500	484	97
Antimony	50	51.9	104	50	53.1	106	50	54.1	108
Arsenic	50	51.4	103	50	52.1	104	50	52.0	104
Barium	50	50.4	101	50	50.7	101	50	50.8	102
Cadmium	50	51.6	103	50	51.9	104	50	52.1	104
Chromium	50	50.7	101	50	50.8	102	50	50.2	100
Copper	50	51.2	102	50	51.0	102	50	51.0	102
Iron	500	495	99	500	495	99	500	488	98
Lead	50	53.5	107	50	54.6	109	50	51.9	104
Manganese	50	50.0	100	50	49.8	100	50	50.0	100
Nickel	50	51.4	103	50	51.6	103	50	50.4	101
Selenium	50	54.0	108	50	54.3	109	50	52.4	105
Silver	25	25.5	102	25	25.6	102	25	25.4	102
Vanadium	50	50.3	101	50	50.7	101	50	50.2	100
Zinc	50	51.8	104	50	51.8	104	50	51.9	104

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 4

Parameter	QC Batch: 148929			QC Batch: 148954			QC Batch: 149116		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	495	99	500	498	100	500	503	101
Antimony	50	54.2	108	50	50.7	101	50	54.0	108
Arsenic	50	51.7	103	50	49.6	99	50	50.8	102
Barium	50	50.6	101	50	48.8	98	50	50.2	100
Cadmium	50	53.7	107	50	50.8	102	50	53.3	107
Chromium	50	49.3	99	50	48.8	98	50	49.6	99
Copper	50	50.4	101	50	48.8	98	50	49.9	100
Iron	500	492	98	500	483	97	500	497	99
Lead	50	55.8	112	50	50.4	101	50	54.6	109
Manganese	50	49.4	99	50	48.0	96	50	48.5	97
Nickel	50	50.6	101	50	48.9	98	50	49.6	99
Selenium	50	53.8	108	50	50.9	102	50	52.8	106
Silver	25	25.6	103	25	24.6	98	25	25.4	102
Vanadium	50	50.0	100	50	48.6	97	50	49.6	99
Zinc	50	52.2	104	50	49.9	100	50	52.1	104

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 5

Parameter	QC Batch: 149117			QC Batch: 149323			QC Batch: 149344		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	499	100	500	503	101	500	505	101
Antimony	50	50.1	100	50	51.8	104	50	51.2	102
Arsenic	50	50.2	100	50	51.3	103	50	51.4	103
Barium	50	48.2	96	50	49.7	99	50	50.1	100
Cadmium	50	51.0	102	50	52.2	104	50	52.6	105
Chromium	50	49.3	99	50	50.1	100	50	50.8	102
Copper	50	50.0	100	50	50.0	100	50	51.0	102
Iron	500	499	100	500	503	101	500	504	101
Lead	50	51.8	104	50	54.2	108	50	53.3	107
Manganese	50	48.6	97	50	49.6	99	50	49.6	99
Nickel	50	50.1	100	50	50.2	100	50	50.8	102
Selenium	50	50.6	101	50	54.0	108	50	51.8	104
Silver	25	24.9	100	25	25.2	101	25	25.7	103
Vanadium	50	49.0	98	50	50.1	100	50	50.2	100
Zinc	50	50.9	102	50	52.2	104	50	51.4	103

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 6

Parameter	QC Batch: 150029		
	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Aluminum	500	500	100
Antimony	50	50.5	101
Arsenic	50	50.5	101
Barium	50	48.9	98
Cadmium	50	50.9	102
Chromium	50	49.4	99
Copper	50	50.0	100
Iron	500	497	99
Lead	50	53.3	107
Manganese	50	48.8	98
Nickel	50	51.0	102
Selenium	50	51.9	104
Silver	25	24.9	100
Vanadium	50	49.2	98
Zinc	50	50.9	102

Table 2-11. Water Method 6020 LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 200-63833			QC Batch: 200-64333			QC Batch: 200-64891		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
Aluminum	80	120	1000	1020	102	1000	1005	100	1000	1024	102
Antimony	80	120	50.0	52.61	105	50.0	52.02	104	50.0	51.10	102
Arsenic	80	120	25.0	25.97	104	25.0	27.11	108	25.0	23.82	95
Barium	80	120	1250	1269	101	1250	1209	97	1250	1286	103
Cadmium	80	120	25.0	26.85	107	25.0	26.14	105	25.0	24.63	99
Chromium	80	120	50.0	52.53	105	50.0	49.43	99	50.0	49.50	99
Copper	80	120	50.0	53.26	107	50.0	51.94	104	50.0	52.85	106
Iron	80	120	2500	2454	98	2500	2437	97	2500	2608	104
Lead	80	120	25.0	26.35	105	25.0	24.93	100	25.0	25.22	101
Manganese	80	120	50.0	51.53	103	50.0	49.97	100	50.0	51.66	103
Nickel	80	120	50.0	53.38	107	50.0	49.73	99	50.0	52.45	105
Selenium	80	120	25.0	25.23	101	25.0	28.67	115	25.0	25.08 ^	100
Silver	80	120	25.0	25.81	103	25.0	25.13	101	25.0	25.15	101
Vanadium	80	120	50.0	53.09	106	50.0	49.87	100	50.0	50.71	101
Zinc	80	120	50.0	51.57	103	50.0	53.14	106	50.0	51.14	102

Table 2-11. Water Method 6020 LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 200-65650			QC Batch: 200-66515			QC Batch: 200-66579		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
Aluminum	80	120	1000	1063	106	1000	942.6 ^	94	1000	1055	106
	80	120	1000	1096	110				1000	1023	102
	80	120	1000	1023	102				1000	1044	104
Antimony	80	120	50.0	51.26	103	50.0	45.98	92	50.0	49.60	99
	80	120	50.0	50.36	101				50.0	49.52	99
	80	120	50.0	46.52	93						
Arsenic	80	120	25.0	25.36	101	25.0	24.37	97	25.0	24.19	97
	80	120	25.0	25.30	101				25.0	26.01	104
	80	120	25.0	23.78	95						
Barium	80	120	1250	1310	105	1250	1190	95	1250	1315	105
	80	120	1250	1291	103				1250	1279	102
	80	120	1250	1196	96						
Cadmium	80	120	25.0	26.15	105	25.0	24.35	97	25.0	26.16	105
	80	120	25.0	25.80	103				25.0	26.12	104
	80	120	25.0	24.13	97						
Chromium	80	120	50.0	51.81	104	50.0	53.85	108	50.0	52.81	106
	80	120	50.0	50.70	101				50.0	52.50	105
	80	120	50.0	47.13	94						
Copper	80	120	50.0	56.36	113	50.0	50.41	101	50.0	55.77	112
	80	120	50.0	54.68	109				50.0	55.79	112
	80	120	50.0	50.07	100						
Iron	80	120	2500	2835	113	2500	2599	104	2500	2731	109
	80	120	2500	2777	111				2500	2817	113
	80	120	2500	2558	102						
Lead	80	120	25.0	25.96	104	25.0	25.60	102	25.0	25.69	103
	80	120	25.0	25.61	102				25.0	25.36	101
	80	120	25.0	24.33	97						
Manganese	80	120	50.0	52.10	104	50.0	54.59	109	50.0	53.25	107
	80	120	50.0	51.12	102				50.0	56.60	113
	80	120	50.0	47.12	94						
Nickel	80	120	50.0	53.92	108	50.0	50.12	100	50.0	53.51	107
	80	120	50.0	53.19	106				50.0	53.50	107
	80	120	50.0	49.06	98						
Selenium	80	120	25.0	26.58	106	25.0	25.09	100	25.0	23.79 ^	95
	80	120	25.0	25.62	102				25.0	26.64 ^	107
	80	120	25.0	23.75	95						
Silver	80	120	25.0	26.08	104	25.0	23.99	96	25.0	26.73	107
	80	120	25.0	26.11	104				25.0	25.79	103
	80	120	25.0	25.37	101						
Vanadium	80	120	50.0	52.84	106	50.0	55.81	112	50.0	54.48	109
	80	120	50.0	52.15	104				50.0	54.30	109
	80	120	50.0	48.73	97						
Zinc	80	120	50.0	55.14	110	50.0	53.03	106	50.0	52.55	105
	80	120	50.0	52.04	104				50.0	54.60	109
	80	120	50.0	46.94	94						

Table 2-12. Sediment Method 7471 LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (mg/kg)	Result (mg/kg)	Rec (%)
		Lower	Upper			
146042	Mercury	85	115	.17	0.15	91
146198	Mercury	85	115	.17	0.16	99
146526	Mercury	85	115	.17	0.16	99
146527	Mercury	85	115	.17	0.16	99
147350	Mercury	85	115	.17	0.15	93
147565	Mercury	85	115	.17	0.16	95
147672	Mercury	85	115	.17	0.16	98
147673	Mercury	85	115	.17	0.17	100
147674	Mercury	85	115	.17	0.16	96
148769	Mercury	85	115	.17	0.17	100
148770	Mercury	85	115	.17	0.16	99
148921	Mercury	85	115	.17	0.16	98
148925	Mercury	85	115	.17	0.16	99
149143	Mercury	85	115	.17	0.16	97
149346	Mercury	85	115	.17	0.16	98
149526	Mercury	85	115	.17	0.17	102
149806	Mercury	85	115	.17	0.16	99
149809	Mercury	85	115	.17	0.17	102
149968	Mercury	85	115	.17	0.17	104
150204	Mercury	85	115	.17	0.18	105
150444	Mercury	85	115	.17	0.15	92
150831	Mercury	85	115	.17	0.18	108

Table 2-13. Water Method 7470 LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (µg/L)	Result (µg/L)	Rec (%)
		Lower	Upper			
200-63737	Mercury	85	115	1.00	1.05	105
200-64789	Mercury	85	115	1.00	0.939	94
200-64995	Mercury	85	115	1.00	1.00	100
200-65197	Mercury	85	115	1.00	1.02	102
		85	115	1.00	1.01	101
200-65612	Mercury	85	115	1.00	0.961	96
200-65936	Mercury	85	115	1.00	0.888	89
200-66217	Mercury	85	115	1.00	0.873	87

Table 2-14. Sediment Method 9012 LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (mg/kg)	Result (mg/kg)	Rec (%)
		Lower	Upper			
146543	Cyanide	80	120	3	3.0	99
146544	Cyanide	80	120	3	3.0	101
146545	Cyanide	80	120	3	3.0	101
146990	Cyanide	80	120	3	3.0	99
146991	Cyanide	80	120	3	2.9	98
146992	Cyanide	80	120	3	3.0	100
147509	Cyanide	80	120	3	3.3	111
147914	Cyanide	80	120	3	2.9	98
147915	Cyanide	80	120	3	3.0	102
147916	Cyanide	80	120	3	3.0	101
148014	Cyanide	80	120	3	3.0	100
148549	Cyanide	80	120	3	3.0	101
148550	Cyanide	80	120	3	2.9	98
148648	Cyanide	80	120	3	3.0	102
149050	Cyanide	80	120	3	3.0	101
149052	Cyanide	80	120	3	3.0	99
149175	Cyanide	80	120	3	3.0	100
149987	Cyanide	80	120	3	3.2	107
150104	Cyanide	80	120	3	2.6	86
150149	Cyanide	80	120	3	3.0	101
150150	Cyanide	80	120	3	3.1	103

Table 2-15. Water Method 9012 LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (µg/L)	Result (µg/L)	Rec (%)
		Lower	Upper			
200-64176	Cyanide, Total	85	115	120	122.3	102
200-64328	Cyanide, Total	85	115	120	120.9	101
200-64895	Cyanide, Total	85	115	120	119.6	100
200-65492	Cyanide, Total	85	115	120	120.1	100
200-65925	Cyanide, Total	85	115	120	120.3	100
200-66376	Cyanide, Total	85	115	120	119.6	100

Table 2-16. Sediment Lloyd Kahn TOC LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (mg/kg)	Result (mg/kg)	Rec (%)
		Lower	Upper			
200-63842	Total Organic Carbon	75	125	20100	19860	99
200-63939	Total Organic Carbon	75	125	20100	19480	97
200-64178	Total Organic Carbon	75	125	20100	21630	108
200-64416	Total Organic Carbon	75	125	20100	20990	104
200-64422	Total Organic Carbon	75	125	20100	19770	98
200-64542	Total Organic Carbon	75	125	20100	21550	107
200-64851	Total Organic Carbon	75	125	20100	20090	100
		75	125	20100	21340	106
200-64918	Total Organic Carbon	75	125	20100	20190	100
200-65183	Total Organic Carbon	75	125	20100	19110	95
200-65293	Total Organic Carbon	75	125	20100	20370	101
200-65384	Total Organic Carbon	75	125	20100	19620	98
200-65439	Total Organic Carbon	75	125	20100	19600 ^	98
200-65517	Total Organic Carbon	75	125	20100	20390	101
200-65584	Total Organic Carbon	75	125	20100	21140	105
200-65663	Total Organic Carbon	75	125	20100	20410	102
200-65706	Total Organic Carbon	75	125	20100	20270	101
200-65760	Total Organic Carbon	75	125	20100	20340	101
200-65840	Total Organic Carbon	75	125	20100	18790	93
200-65894	Total Organic Carbon	75	125	20100	21110	105
200-65961	Total Organic Carbon	75	125	20100	19260	96
200-66047	Total Organic Carbon	75	125	20100	19940	99
200-66190	Total Organic Carbon	75	125	20100	20940	104

Table 2-17. Sediment Lloyd Kahn Black Carbon LCS Results Summary

QC Batch	Parameter	Rec Limits (%)		Spike (mg/kg)	Result (mg/kg)	Rec (%)
		Lower	Upper			
200-63898	Black Carbon	50	150	9900	10310	104
200-64539	Black Carbon	50	150	9900	9445	95
200-65585	Black Carbon	50	150	9900	8280	84
200-65841	Black Carbon	50	150	9900	11790	119
200-66350	Black Carbon	50	150	9900	8335	84

2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were evaluated for each of the parameters at appropriate frequencies.

It is important to note all matrix spike analyses on water samples were performed using equipment blanks.

Most MS/MSDs failed to recover within the acceptance limits for multiple analytes. In some cases, the failures were assignable to a low spike concentration relative to the amount present in the parent sample (i.e., sample amount exceeded 4x the spike concentration). Such circumstances do not merit qualification of the data. All MS/MSD samples analyzed using ICP-MS had post digestion spikes analyzed that fell within the acceptable range of recovery. For ICP-MS results:

- Results associated with recoveries less than 75% will be qualified as estimated ("J") above the MDL, and estimated as ("UJ") for non-detects,
- Results associated with recoveries greater than 125%, will be qualified as estimated ("J") for results above the MDL.

For available cyanide and mercury results:

- Results associated with recoveries less than 30%, will be qualified as estimated low ("J-") for results greater than the MDL and non-detects as unusable ("R"),
- Results associated with recoveries between 30-74% will be qualified as estimated low ("J-") for results above the MDL as and non-detects qualified as estimated ("UJ"),
- Results associated with recoveries above 125% will be qualified as estimated high ("J+") for results above the MDL.

Total organic carbon failures will be qualified as estimated ("J"). All qualifications will be for the parent sample and MS/MSD only.

The MS/MSD data are given in Tables 2-18 through 2-23.

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 102913343

Parameter	MS Sample ID: 102913343			MSD Sample ID: 102913343			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	604	19300	779	604	19300	778	0	14600 P6	20
Antimony	60.4	21.5	35	60.4	21.1	34	2	0.33 JD3, M0	20
Arsenic	60.4	73.3	103	60.4	71.3	100	3	11.2	20
Barium	60.4	113	119	60.4	112	118	1	41.1	20
Cadmium	60.4	63.1	104	60.4	61.5	102	3	0.19 JD3	20
Chromium	60.4	87.9	105	60.4	87.7	105	0	24.4	20
Copper	60.4	98.3	111	60.4	90.6	98	8	31.3	20
Iron	604	27500	384	604	26300	194	4	25200 P6	20
Lead	60.4	76.2	100	60.4	75.6	100	1	15.5	20
Manganese	60.4	485	109	60.4	468	81	4	419	20
Nickel	60.4	96.5	99	60.4	95.5	98	1	36.5	20
Selenium	60.4	65.3	105	60.4	63.9	103	2	1.6	20
Silver	30.3	29.2	96	30.3	28.9	96	1	0.043 JD3	20
Vanadium	60.4	98.1	111	60.4	97.1	109	1	31.3	20
Zinc	60.4	118	93	60.4	117	92	1	61.7	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 102813277

Parameter	MS Sample ID: 102813277			MSD Sample ID: 102813277			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	582	16900	822	582	16800	804	1	12100 P6	20
Antimony	58.2	25.2	43	58.2	24.7	42	2	0.30 JD3, M0	20
Arsenic	58.2	71.8	104	58.2	70.6	101	2	11.5	20
Barium	58.2	103	115	58.2	103	116	0	35.9	20
Cadmium	58.2	60.6	104	58.2	60	103	1	0.15 UD3	20
Chromium	58.2	83.0	107	58.2	82.8	107	0	20.8	20
Copper	58.2	91.1	102	58.2	92.9	105	2	31.9	20
Iron	582	26700	466	582	25500	270	4	24000 P6	20
Lead	58.2	75.6	61	58.2	76	61	0	40.2 M0	20
Manganese	58.2	474	96	58.2	475	99	0	417	20
Nickel	58.2	94.1	102	58.2	92	99	2	34.5	20
Selenium	58.2	62.4	104	58.2	62.1	104	1	1.8	20
Silver	29.1	28.5	98	29.1	28.4	98	0	0.031 UD3	20
Vanadium	58.2	91.2	111	58.2	89.4	107	2	26.8	20
Zinc	58.2	116	94	58.2	119	100	3	60.6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 110113376

Parameter	MS Sample ID: 110113376			MSD Sample ID: 110113376			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1170	17200	390	1170	18300	483	6	12600 P6	20
Antimony	117	73.3	59	117	76.9	61	5	4.9 M0	20
Arsenic	117	136	101	117	139	103	2	18	20
Barium	117	652	94	117	700	135	7	542 P6	20
Cadmium	117	190	104	117	201	113	6	68.3	20
Chromium	117	912	124	117	965	169	6	766 P6	20
Copper	117	704	141	117	704	140	0	540 P6	20
Iron	1170	26800	60	1170	29000	245	8	26100 P6	20
Lead	117	1240	191	117	1180	143	5	1010 P6	20
Manganese	117	446	92	117	469	112	5	338	20
Nickel	117	351	120	117	345	113	2	211	20
Selenium	117	118	98	117	119	98	1	4	20
Silver	58.3	84.3	100	58.3	80	92	5	25.9	20
Vanadium	117	128	102	117	131	103	2	9.9	20
Zinc	117	2980	226	117	2970	214	0	2720 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 110413458

Parameter	MS Sample ID: 110413458			MSD Sample ID: 110413458			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	566	16400	1190	566	16400	1180	0	9730 P6	20
Antimony	56.6	28.5	49	56.6	27.1	47	5	0.59 JD3, M0	20
Arsenic	56.6	69.5	97	56.6	67.8	95	2	14.4	20
Barium	56.6	104	127	56.6	106	131	2	32.3 M0	20
Cadmium	56.6	57.9	102	56.6	57.1	101	1	1.1 UD3	20
Chromium	56.6	80.1	112	56.6	81.1	115	1	16.4	20
Copper	56.6	165	232	56.6	88.2	96	61	33.9 M0, R1	20
Iron	566	25600	932	566	24800	784	3	20300 P6	20
Lead	56.6	75.3	-3770	56.6	76.5	-3790	2	2210 P6	20
Manganese	56.6	463	127	56.6	481	159	4	391 P6	20
Nickel	56.6	91.8	113	56.6	90.2	110	2	27.9	20
Selenium	56.6	61.2	106	56.6	60.8	105	1	1.4	20
Silver	28.3	26.9	95	28.3	26.6	94	1	0.086 JD3	20
Vanadium	56.6	89.1	118	56.6	88.1	117	1	22.2	20
Zinc	56.6	118	142	56.6	126	156	6	37.7 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111113038

Parameter	MS Sample ID: 111113038			MSD Sample ID: 111113038			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	624	20300	898	624	20200	887	0	14700 P6	20
Antimony	62.4	29.2	46	62.4	28.7	46	1	0.29 JD3, M0	20
Arsenic	62.4	69.2	91	62.4	71.1	95	3	12.1	20
Barium	62.4	128	122	62.4	127	121	1	52	20
Cadmium	62.4	61.4	98	62.4	60.6	97	1	1.2 UD3	20
Chromium	62.4	93.6	111	62.4	89.5	105	5	24.3	20
Copper	62.4	97.2	102	62.4	93	96	4	33.4	20
Iron	624	27500	104	624	28200	229	3	26800 P6	20
Lead	62.4	85.9	109	62.4	81.1	102	6	17.9	20
Manganese	62.4	472	-43	62.4	463	-57	2	499 P6	20
Nickel	62.4	97.6	99	62.4	96.1	97	2	36	20
Selenium	62.4	67.4	104	62.4	66.1	102	2	2.4	20
Silver	31.2	29.1	93	31.2	28.8	93	1	0.034 JD3	20
Vanadium	62.4	101	109	62.4	99.3	107	1	32.6	20
Zinc	62.4	139	127	62.4	128	109	9	59.9 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111313092

Parameter	MS Sample ID: 111313092			MSD Sample ID: 111313092			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	582	15500	594	582	15400	574	1	12000 P6	20
Antimony	58.2	28.8	49	58.2	29.1	49	1	0.54 JD3, M0	20
Arsenic	58.2	71.3	101	58.2	70.5	99	1	12.6	20
Barium	58.2	104	110	58.2	108	116	4	39.8	20
Cadmium	58.2	58.6	100	58.2	59.7	102	2	0.41 JD3	20
Chromium	58.2	79.8	97	58.2	83.4	103	4	23.2	20
Copper	58.2	90.9	86	58.2	96.7	95	6	41.1	20
Iron	582	24900	-37	582	24900	-51	0	25200 P6	20
Lead	58.2	75.0	83	58.2	84.9	100	12	26.6	20
Manganese	58.2	519	161	58.2	512	148	1	425 P6	20
Nickel	58.2	92.4	95	58.2	91.9	94	1	36.9	20
Selenium	58.2	59.8	100	58.2	60.2	100	1	1.6	20
Silver	29.1	27.8	95	29.1	28	96	1	0.14 JD3	20
Vanadium	58.2	88.9	106	58.2	89.4	106	1	27.2	20
Zinc	58.2	129	100	58.2	145	126	11	70.9 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111513200

Parameter	MS Sample ID: 111513200			MSD Sample ID: 111513200			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1380	23100	395	1380	23200	410	1	17600 P6	20
Antimony	138	91.1	63	138	90.8	63	0	3.9 M0	20
Arsenic	138	154	103	138	153	102	1	12.7	20
Barium	138	579	104	138	581	106	0	436	20
Cadmium	138	212	96	138	216	101	2	78.4	20
Chromium	138	664	68	138	686	85	3	570 P6	20
Copper	138	696	66	138	718	82	3	606 P6	20
Iron	1380	28100	120	1380	28100	126	0	26400 P6	20
Lead	138	1060	-1	138	969	-65	9	1060 P6	20
Manganese	138	540	147	138	472	98	14	337 M0	20
Nickel	138	347	88	138	355	95	2	225	20
Selenium	138	153	108	138	145	103	5	3.8	20
Silver	69.2	94.7	97	69.2	98.8	103	4	27.8	20
Vanadium	138	168	108	138	164	107	2	17.8	20
Zinc	138	2170	44	138	2200	71	2	2110 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111813252

Parameter	MS Sample ID: 111813252			MSD Sample ID: 111813252			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	621	21000	777	621	21000	773	0	16200 P6	20
Antimony	62.1	31.2	49	62.1	29.6	46	5	0.45 JD3, M0	20
Arsenic	62.1	74.9	104	62.1	73.9	102	1	10.3	20
Barium	62.1	127	119	62.1	128	120	1	52.8	20
Cadmium	62.1	63.9	102	62.1	63.7	101	0	0.20 JD3	20
Chromium	62.1	92.8	105	62.1	93.9	106	1	27.6	20
Copper	62.1	91.8	98	62.1	90.2	94	2	31.1	20
Iron	621	27600	290	621	26200	63	5	25800 P6	20
Lead	62.1	76.9	99	62.1	76.6	98	0	15.4	20
Manganese	62.1	458	82	62.1	462	88	1	407	20
Nickel	62.1	102	100	62.1	101	98	1	39.5	20
Selenium	62.1	66.9	105	62.1	68.1	106	2	1.6	20
Silver	31.1	30.6	98	31.1	30.6	98	0	0.091 JD3	20
Vanadium	62.1	105	112	62.1	104	111	0	35.3	20
Zinc	62.1	124	102	62.1	133	114	7	61.1	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 111913305

Parameter	MS Sample ID: 111913305			MSD Sample ID: 111913305			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	770	24400	650	770	24900	724	2	19400 P6	20
Antimony	77	32.8	42	77	31.2	40	5	0.44 JD3, M0	20
Arsenic	77	94.5	108	77	90	102	5	11.5	20
Barium	77	159	109	77	161	112	1	75.3	20
Cadmium	77	79.0	102	77	76.5	99	3	0.23 JD3	20
Chromium	77	116	106	77	114	104	2	34.2	20
Copper	77	119	106	77	112	98	6	36.7	20
Iron	770	33400	451	770	31300	180	6	29900 P6	20
Lead	77	101	107	77	97.5	103	3	18.5	20
Manganese	77	585	94	77	571	76	2	513	20
Nickel	77	127	105	77	121	98	5	45.8	20
Selenium	77	79.8	100	77	80.6	101	1	2.9	20
Silver	38.6	37.8	98	38.6	36.8	96	3	0.12 JD3	20
Vanadium	77	127	111	77	126	110	1	41.6	20
Zinc	77	153	104	77	148	99	3	72.2	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 112013358

Parameter	MS Sample ID: 112013358			MSD Sample ID: 112013358			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	632	20600	745	632	20600	753	0	15900 P6	20
Antimony	63.2	32.8	51	63.2	33.1	51	1	0.73 JD3, M0	20
Arsenic	63.2	75.6	103	63.2	75.8	103	0	10.3	20
Barium	63.2	133	117	63.2	136	122	3	58.5	20
Cadmium	63.2	66.9	105	63.2	67.5	105	1	0.56 JD3	20
Chromium	63.2	92.9	97	63.2	94.3	99	1	31.7	20
Copper	63.2	98.9	108	63.2	95	101	4	30.8	20
Iron	632	26600	184	632	26400	158	1	25400 P6	20
Lead	63.2	82.1	104	63.2	83.6	106	2	16.2	20
Manganese	63.2	475	99	63.2	486	116	2	413	20
Nickel	63.2	101	100	63.2	102	100	1	38.5	20
Selenium	63.2	70.2	107	63.2	70.6	107	0	2.7	20
Silver	31.6	31.3	98	31.6	31.2	97	0	0.31 JD3	20
Vanadium	63.2	104	108	63.2	105	110	2	35.6	20
Zinc	63.2	125	101	63.2	147	134	16	61.4 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 112213427

Parameter	MS Sample ID: 112213427			MSD Sample ID: 112213427			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1350	24300	435	1350	22500	303	8	18400 P6	20
Antimony	135	86.3	62	135	88.8	64	3	2.3 JD3, M0	20
Arsenic	135	145	100	135	145	100	0	10.4	20
Barium	135	463	100	135	445	86	4	329	20
Cadmium	135	158	101	135	153	98	3	21.8	20
Chromium	135	294	93	135	270	75	8	169	20
Copper	135	439	93	135	427	84	3	313	20
Iron	1350	28100	156	1350	25900	-4	8	26000 P6	20
Lead	135	412	81	135	389	64	6	303	20
Manganese	135	516	104	135	502	93	3	376	20
Nickel	135	194	96	135	180	85	8	65.1	20
Selenium	135	143	103	135	141	101	2	5.1	20
Silver	67.3	83.4	97	67.3	78.7	90	6	18.2	20
Vanadium	135	170	106	135	163	101	4	27.9	20
Zinc	135	1260	56	135	1190	10	5	1180 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 112613492

Parameter	MS Sample ID: 112613492			MSD Sample ID: 112613492			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1240	23200	514	1240	24000	580	4	16800 P6	20
Antimony	124	79.0	62	124	77.3	61	2	1.8 JD3, M0	20
Arsenic	124	134	102	124	135	102	1	8.0	20
Barium	124	402	118	124	406	122	1	255	20
Cadmium	124	143	106	124	146	108	2	11.3	20
Chromium	124	268	122	124	271	124	1	117	20
Copper	124	400	119	124	400	119	0	253	20
Iron	1240	26700	228	1240	26600	220	0	23800 P6	20
Lead	124	365	109	124	364	109	0	229	20
Manganese	124	462	97	124	454	91	2	341	20
Nickel	124	186	107	124	189	109	1	53.9	20
Selenium	124	128	101	124	129	102	0	2.6	20
Silver	61.9	77.4	102	61.9	79.2	105	2	14.3	20
Vanadium	124	157	104	124	160	106	2	28.4	20
Zinc	124	1110	182	124	1110	186	0	880 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 120213560

Parameter	MS Sample ID: 120213560			MSD Sample ID: 120213560			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	627	21300	820	627	21600	869	1	16100 P6	20
Antimony	62.7	28.7	45	62.7	28.8	45	0	0.55 JD3, M0	20
Arsenic	62.7	72.6	101	62.7	73.5	102	1	9.2	20
Barium	62.7	139	120	62.7	138	118	1	64.4	20
Cadmium	62.7	65.2	104	62.7	64.6	103	1	0.17 JD3	20
Chromium	62.7	96.1	108	62.7	94.5	105	2	28.3	20
Copper	62.7	94.0	105	62.7	92.4	102	2	28.4	20
Iron	627	27100	252	627	27100	264	0	25500 P6	20
Lead	62.7	82.6	95	62.7	78.4	89	5	22.8	20
Manganese	62.7	474	-74	62.7	474	-73	0	520 P6	20
Nickel	62.7	100	99	62.7	102	102	2	37.8	20
Selenium	62.7	66.9	104	62.7	67.8	106	1	1.5	20
Silver	31.4	30.7	98	31.4	30.5	97	0	0.064 JD3	20
Vanadium	62.7	104	110	62.7	105	111	1	34.9	20
Zinc	62.7	135	115	62.7	123	97	9	62.4	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 120413619

Parameter	MS Sample ID: 120413619			MSD Sample ID: 120413619			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)			
Aluminum	1270	23700	444	1270	24000	472	1	18000 P6	20
Antimony	127	77.6	59	127	74.7	57	4	2.6 M0	20
Arsenic	127	139	101	127	139	102	0	10	20
Barium	127	491	105	127	501	114	2	358	20
Cadmium	127	180	105	127	180	105	0	47.0	20
Chromium	127	440	105	127	446	110	1	307	20
Copper	127	580	114	127	575	111	1	435	20
Iron	1270	27300	136	1270	27100	116	1	25600 P6	20
Lead	127	568	108	127	596	131	5	431 M0	20
Manganese	127	454	98	127	448	95	1	329	20
Nickel	127	274	102	127	281	109	3	144	20
Selenium	127	131	100	127	131	101	0	3.3	20
Silver	63.4	90.3	101	63.4	90.4	102	0	26.4	20
Vanadium	127	158	105	127	160	107	1	24.9	20
Zinc	127	1630	110	127	1640	120	1	1490	20

Table 2-19. Water Method 6020 MS Recoveries

Sample ID	Parameter	Spike (µg/L)	MS Result (µg/L)	Rec (%)	Lab Sample Result (µg/L)
102913290	Aluminum	1000	1063	106	6.0 U
	Antimony	50.0	53.75	108	20.0 U
	Arsenic	25.0	27.40	110	2.0 U
	Barium	1250	1306	104	0.57 J
	Cadmium	25.0	27.79	111	2.0 U
	Chromium	50.0	54.72	109	4.0 U
	Copper	50.0	54.78	110	20.0 U
	Iron	2500	2540	102	8.3 U
	Lead	25.0	27.10	108	0.037 J
	Manganese	50.0	53.06	106	1.0 U
	Nickel	50.0	54.96	110	0.63 U
	Selenium	25.0	27.19	109	2.0 U
	Silver	25.0	26.72	107	2.0 U
	Vanadium	50.0	55.21	110	4.0 U
	Zinc	50.0	54.38	105	1.9 J B
	112513451	Aluminum	1000	1028	100
Antimony		50.0	45.61	91	20.0 U
Arsenic		25.0	23.48	94	2.0 U
Barium		1250	1184	95	1.3 J
Cadmium		25.0	23.65	95	2.0 U
Chromium		50.0	46.27	92	0.27 J
Copper		50.0	49.41	98	0.60 J
Iron		2500	2536	101	19.2 J
Lead		25.0	24.12	96	0.12 J
Manganese		50.0	46.62	93	1.0 U
Nickel		50.0	47.84	96	0.63 U
Selenium		25.0	22.96	92	2.0 U
Silver		25.0	25.30	101	2.0 U
Vanadium		50.0	47.44	95	4.0 U
Zinc		50.0	45.62	86	2.5 J
120513657		Aluminum	1000	985.9 ^	96
	Antimony	50.0	47.91	96	0.12 J B
	Arsenic	25.0	25.17	100	0.17 J
	Barium	1250	1249	100	100 U
	Cadmium	25.0	25.46	102	2.0 U
	Chromium	50.0	54.43	103	2.7 J B
	Copper	50.0	51.88	102	0.64 J
	Iron	2500	2661	105	46.6 J
	Lead	25.0	26.86	107	2.0 U

Sample ID	Parameter	Spike (µg/L)	MS Result (µg/L)	Rec (%)	Lab Sample Result (µg/L)
	Manganese	50.0	55.36	111	1.0 U
	Nickel	50.0	50.99	102	0.63 U
	Selenium	25.0	25.42	100	0.37 J B
	Silver	25.0	25.26	101	2.0 U
	Vanadium	50.0	57.00	111	1.6 J B
	Zinc	50.0	52.63	100	2.5 J B
120213518	Aluminum	1000	2094 F	36	1730 B
	Antimony	50.0	45.28	91	20.0 U
	Arsenic	25.0	23.35	93	2.0 U
	Barium	1250	1221	97	10.3 J
	Cadmium	25.0	24.28	97	2.0 U
	Chromium	50.0	52.27	98	3.2 J B
	Copper	50.0	54.81	103	3.4 J B
	Iron	2500	4298	90	2050
	Lead	25.0	25.77	95	2.0 B
	Manganese	50.0	88.02	94	40.9
	Nickel	50.0	52.37	99	2.7 J
	Selenium	25.0	22.59 ^	90	2.0 U ^
	Silver	25.0	24.46	98	0.016 J
	Vanadium	50.0	53.39	102	2.3 J
	Zinc	50.0	56.12	91	10.5 J B
120613843	Aluminum	1000	1029	101	22.8 J
	Antimony	50.0	49.37	99	20.0 U
	Arsenic	25.0	24.83	99	2.0 U
	Barium	1250	1277	102	100 U
	Cadmium	25.0	26.11	104	2.0 U
	Chromium	50.0	50.53	101	4.0 U
	Copper	50.0	53.51	106	0.29 J B
	Iron	2500	2666	106	16.3 J
	Lead	25.0	24.60	98	0.11 J B
	Manganese	50.0	51.64	103	1.0 U
	Nickel	50.0	52.00	104	0.63 U
	Selenium	25.0	25.42 ^	102	2.0 U ^
	Silver	25.0	25.94	104	2.0 U
	Vanadium	50.0	52.72	105	4.0 U
	Zinc	50.0	52.27	99	2.5 J B

Table 2-20. Sediment Method 7471 MS/MSD Recoveries

Sample ID	Parameter	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)	RPD	Lab Sample Result (mg/kg)	Max RPD
102813277	Mercury	.2	0.19	71	.2	0.2	72	1	0.055 M0	20
110113376	Mercury	.4	5.5	306	.4	5.5	317	1	4.3 P6	20
110413458	Mercury	.19	0.21	97	.19	0.2	94	3	0.026	20
110413434	Mercury	.38	3.5	-143	.38	4	-14	13	4 P6	20
111113038	Mercury	.21	0.23	99	.21	0.22	96	3	0.021	20
111213062	Mercury	.35	3.4	68	.35	3.5	100	3	3.2 P6	20
111313092	Mercury	.2	0.21	98	.2	0.21	97	1	0.021	20
111513200	Mercury	.47	3.3	214	.47	3	147	10	2.4 P6	20
111813252	Mercury	.21	0.22	97	.21	0.24	103	6	0.022	20
111913305	Mercury	.26	0.27	96	.26	0.27	96	0	0.024	20
112013358	Mercury	.22	0.22	97	.22	0.23	98	2	0.020	20
112213427	Mercury	.43	2.5	160	.43	2.2	76	16	1.8 P6	20
112213443	Mercury	.38	4.9	63	.38	5.4	210	11	4.6 P6	20
112613492	Mercury	.42	2.8	333	.42	2.1	167	29	1.4 M0, R1	20
120213522	Mercury	.57	3.6	299	.57	2.9	176	21	1.9 M0, R1	20
120213560	Mercury	.21	0.23	99	.21	0.23	101	1	0.023	20
120413619	Mercury	.41	2.4	148	.41	2.3	119	5	1.8 P6	20
120613845	Mercury	.29	2.4	-152	.29	3.3	163	32	2.8 P6, R1	20

Table 2-21. Water Method 7470 MS Recoveries

Sample ID	Parameter	Spike (µg/L)	MS Result (µg/L)	Rec (%)	Lab Sample Result (µg/L)
110113373	Mercury	1.00	0.980	98	0.20 U
111513157	Mercury	1.00	0.998	93	0.064 J B
120213520	Mercury	1.00	1.04	97	0.069 J B
120613843	Mercury	1.00	0.905	91	0.20 U

Table 2-22. Sediment Method 9012 MS/MSD Recoveries

Sample ID	Parameter	Spike (mg/kg)	MS Result (mg/kg)	Rec (%)	Spike (mg/kg)	MSD Result (mg/kg)	Rec (%)	RPD	Lab Sample Result (mg/kg)	Max RPD
102813264	Cyanide	7.8	7.1	62	7.8	8	74	12	2.2 M0	20
102813277	Cyanide	2.9	2.9	96	2.9	2.9	95	1	0.18 U	20
102913309		6.2	6.6	88	6.2	6.7	90	2	1.2 JB	20
102913343	Cyanide	2.3	2.4	99	2.3	2.4	98	1	0.15 U	20
110113376	Cyanide	9.4	14.4	116	9.4	12.6	97	13	3.5	20
110113429	Cyanide	5	5.1	96	5	5.1	98	1	0.32 J	20
110413458		4.9	4.7	94	4.9	4.9	98	3	0.30 U	20
110413471	Cyanide	3.4	3.5	101	3.4	3.5	101	1	0.21 U	20
110813518	Cyanide	2.3	2.3	94	2.3	3.1	130	31	0.14 UM0, R1	20
111113038	Cyanide	4.4	4.3	95	4.4	4.4	98	3	0.28 U	20
111213045		14.4	15.3	101	14.4	14.4	95	6	0.89 U	20
111313092	Cyanide	4.1	4.2	98	4.1	4.6	108	10	0.26 U	20
111413134		9.2	11.4	82	9.2	12.7	96	10	3.9	20
111413155	Cyanide	3.5	3.6	97	3.5	3.6	98	1	0.22 U	20
111513200	Cyanide	10.5	18.9	103	10.5	14.3	59	28	8.2 M0, R1	20
111513208		4.2	9.4	37	4.2	4.5	-78	71	7.8 M0, R1	20
111813220	Cyanide	6.8	7.1	90	6.8	7.3	93	3	0.96 J	20
111813241		12.3	13.8	92	12.3	14.5	97	5	2.5	20
111813252	Cyanide	4.8	4.9	102	4.8	4.9	101	1	0.29 U	20
111913305		4.5	4.7	101	4.5	4.5	97	3	0.28 U	20
112013340	Cyanide	9.7	35.7	17	9.7	45.4	118	24	34.0 M0, R1	20
112013358		3.8	3.7	96	3.8	3.6	94	2	0.24 U	20
112213423	Cyanide	4	4.2	100	4	4.2	99	1	0.26 U	20
112213427	Cyanide	13.5	14.7	99	13.5	14.7	99	0	1.3 J	20
112513466		7.9	14.6	152	7.9	10.3	97	34	2.7 M0, R1	20
112613492	Cyanide	13.7	14.8	102	13.7	13.9	94	7	1.1 J	20
120213546	Cyanide	11.4	12.9	105	11.4	13.4	110	4	1.0 J	20
120213560	Cyanide	3.7	2.9	78	3.7	1.6	40	60	0.22 UM0, R1	20
120413619	Cyanide	8.9	10.2	79	8.9	13.3	114	27	3.1 M0, R1	20
120413635		8.6	10.6	89	8.6	9.5	77	10	2.9 M0	20
120613846	Cyanide	2.8	5.5	73	2.8	3	-14	58	3.4 M0, R1	20
120613860		3.9	4.1	98	3.9	3.9	94	4	0.32 J	20

Table 2-23. Sediment Lloyd Kahn TOC MS Recoveries

<i>Sample ID</i>	<i>Parameter</i>	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
102913343	Total Organic Carbon	35000	71660	86	41500	20
102813277	Total Organic Carbon	35000	86990	111	48300 B	20
110113376	Total Organic Carbon	35000	168600 4	78	141000 B	20
110413458	Total Organic Carbon	35000	73620 F	74	47600 B	20
111113038	Total Organic Carbon	31000	72840	105	40300	20
111313092	Total Organic Carbon	33000	84080	94	53000 B	20
111513200	Total Organic Carbon	31800	142600 H	83	116000 H B	20
111813252	Total Organic Carbon	33300	78650	107	43000 B	20
111913305	Total Organic Carbon	31500	77400	112	42000 B	20
112213427	Total Organic Carbon	32700	132300	106	97600 B ^	20
112613492	Total Organic Carbon	31300	120100 F	63	101000	20
120213560	Total Organic Carbon	31500	68340	86	41200 B ^	20
120413619	Total Organic Carbon	33700	139000 F	134	93700	20

2.7 Internal Standards

The National Functional Guidelines for Inorganic Data Review, January 2010 requires the relative intensity (%RI) for ICP/MS internal standards to fall within 60-125% for each sample analysis relative to the calibration standards. The internal standards bismuth did not meet this criterion. In the event an internal standard in a sample relative intensity is not within the 60-125% limit, the NFG direct the reviewer to qualify the data for those analytes with atomic masses that fall between the atomic mass of the internal standard lighter than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard, or between the limit (upper or lower) of the mass range and the nearest unaffected internal standard. Based upon this guidance the only analyte affected is lead. Results for lead for samples 102813282, 102813283, 102813284, 102913299, 102913300, and 102913301, will be qualified as estimated (“J”) for results greater than the MDL and (“UJ”) for non-detect results.

2.8 ICP/MS Serial Dilutions

Serial dilution tests were performed by the laboratory on an analytical batch basis.

All serial dilution tests met the acceptance criterion defined in the test method for most of the metals with the exception of 103013363 (equipment blank) for iron, and 111513159 which failed for copper and zinc. Results that are >MDL for iron in sample 103013363, and copper and zinc results in SDG 4088879 will be qualified as estimated ("J"), while non-detects are qualified as estimated ("UJ").

2.9 TOC Quadruplicate Analysis

According to the Lloyd Kahn method one in every 20 samples in a batch should be run in quadruplicate, and meet a criterion of less than three standard deviations (3SD). The lab ran what appears to be every sample in quadruplicate. All of the samples that did not meet the 3SD were rerun, or rejected by calculation through a Dixon outlier test.

2.10 Field Duplicates

Field duplicates were collected and analyzed for all of the inorganic parameters. Field duplicates generally show agreement for all of the analytes where the values are above the sample quantitation limit. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs.

Criteria for evaluating field duplicate precision is provided in the Multi-Site QAPP Addendum dated March 12, 2012. Worksheet #28 of that addendum defines an upper limit of 30% RPD for precision between field duplicate values for inorganic parameters.

For the inorganic field duplicates, multiple sample results exceeded 30% RPD above the LOQ. Based upon the RPD values, sample results for failed elements and duplicate samples will be qualified as estimated ("J").

The results of the duplicate analyses are given in Tables 2-24 through 2-28.

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	10800		455	10400		459	3.8	14600	P6	301	13800		265	5.6
Antimony	3.4		1.8	2		1.8	51.9	0.33	JD3, M0	1.2	0.30	JD3	1.1	9.5
Arsenic	9.6		1.8	7.8		1.8	20.7	11.2		1.2	11.4		1.1	1.8
Barium	368		1.8	338		1.8	8.5	41.1		1.2	42.3		1.1	2.9
Cadmium	38.9		1.8	35.6		1.8	8.9	0.19	JD3	1.2	1.1	UD3	1.1	NC
Chromium	341		1.8	296		1.8	14.1	24.4		1.2	24.5		1.1	0.4
Copper	440		1.8	346		1.8	23.9	31.3		1.2	34.1		1.1	8.6
Iron	24400		455	21100		459	14.5	25200	P6	301	25100		265	0.4
Lead	789		18.2	711		18.3	10.4	15.5		1.2	17.9		1.1	14.4
Manganese	372		1.8	303		1.8	20.4	419		1.2	407		1.1	2.9
Nickel	236		1.8	207		1.8	13.1	36.5		1.2	37.6		1.1	3.0
Selenium	2.8		1.8	3		1.8	6.9	1.6		1.2	1.9		1.1	17.1
Silver	17.9		0.91	16		0.92	11.2	0.043	JD3	0.60	0.067	JD3	0.53	43.6
Vanadium	14.1		1.8	13.3		1.8	5.8	31.3		1.2	29.8		1.1	4.9
Zinc	1360		364	1170		367	15.0	61.7		24.1	57.2		21.2	7.6

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 1

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	12100		273	12200		552	0.8	12900		426	13100		458	1.5
Antimony	0.26	JD3	1.1	4.1		2.2	176.1	3.4		1.7	3.9		1.8	13.7
Arsenic	13.2		1.1	19.7		2.2	39.5	38.6		1.7	42.5		1.8	9.6
Barium	44.8		1.1	562		2.2	170.5	482		1.7	530		1.8	9.5
Cadmium	0.32	JD3	1.1	104		2.2	198.8	5.4		1.7	2.8		1.8	63.4
Chromium	23.6		1.1	1030		2.2	191.0	496		1.7	538		1.8	8.1
Copper	36.8		1.1	636		2.2	178.1	269		1.7	269		1.8	0.0
Iron	25000		273	22900		552	8.8	25500		426	25000		458	2.0
Lead	21.1		1.1	946		2.2	191.3	681		1.7	701		1.8	2.9
Manganese	429		1.1	291		2.2	38.3	372		1.7	367		1.8	1.4
Nickel	36.7		1.1	215		2.2	141.7	39		1.7	34		1.8	13.7
Selenium	1.7		1.1	3.9		2.2	78.6	2.6		1.7	2.6		1.8	0.0
Silver	0.11	JD3	0.55	21.3		1.1	197.9	7.8		0.85	11		0.92	34.0
Vanadium	28.7		1.1	0.51	UD3	2.2	NC	14.9		1.7	13.8		1.8	7.7
Zinc	88.7		21.9	2940		44.2	188.3	1040		34.1	1020		36.7	1.9

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 2

Parameter	Sample ID: 111313084			Sample ID: 111313095			RPD	Sample ID: 111513201			Sample ID: 111513208			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	16600		496	14400		485	14.2	18500		606	8040		287	78.8
Antimony	2.6		2.0	3		1.9	14.3	3.6		2.4	1.2		1.1	100.0
Arsenic	17		2.0	16.9		1.9	0.6	14.3		2.4	6.1		1.1	80.4
Barium	423		2.0	437		1.9	3.3	479		2.4	201		1.1	81.8
Cadmium	87.3		2.0	83.1		1.9	4.9	114		2.4	43.9		1.1	88.8
Chromium	1290		2.0	1760		1.9	30.8	763		2.4	336		1.1	77.7
Copper	670		2.0	695		1.9	3.7	733		2.4	342		1.1	72.7
Iron	26600		496	26100		485	1.9	26100		606	11700		287	76.2
Lead	925		2.0	899		1.9	2.9	1420		2.4	563		1.1	86.4
Manganese	368		2.0	326		1.9	12.1	326		2.4	142		1.1	78.6
Nickel	150		2.0	198		1.9	27.6	246		2.4	108		1.1	78.0
Selenium	3.2		2.0	3.8		1.9	17.1	4		2.4	1.7		1.1	80.7
Silver	18.9		0.99	20.4		0.97	7.6	32.8		1.2	14.8		0.57	75.6
Vanadium	3.8		2.0	2.2	UD3	9.7	NC	17.7		2.4	8.3		1.1	72.3
Zinc	2610		39.6	2940		38.8	11.9	2620		48.5	1080		23.0	83.2

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 3

Parameter	Sample ID: 111813251			Sample ID: 111813258			RPD	Sample ID: 112213444			Sample ID: 112213446			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	10400		362	12300		489	16.7	13000		282	12500		250	3.9
Antimony	3.8		1.4	4.7		2.0	21.2	0.33	JD3	1.1	0.29	JD3	1.0	12.9
Arsenic	30.6		1.4	40.7		2.0	28.3	12.0		1.1	13.0		1.0	8.0
Barium	405		1.4	535		2.0	27.7	35.1		1.1	34.9		1.0	0.6
Cadmium	32.5		1.4	57.5		2.0	55.6	0.28	JD3	1.1	0.17	JD3	1.0	48.9
Chromium	491		1.4	723		2.0	38.2	23.4		1.1	22.2		1.0	5.3
Copper	350		1.4	645		2.0	59.3	35.1		1.1	35.2		1.0	0.3
Iron	19600		362	24400		489	21.8	24200		282	24300		250	0.4
Lead	545		2.9	843		2.0	42.9	18.3		1.1	18.3		1.0	0.0
Manganese	227		1.4	275		2.0	19.1	460		1.1	454		1.0	1.3
Nickel	65.3		1.4	104		2.0	45.7	37.6		1.1	35.9		1.0	4.6
Selenium	2.8		1.4	4.3		2.0	42.3	2.1		1.1	2.0		1.0	4.9
Silver	7.3		0.72	13.3		0.98	58.3	0.076	JD3	0.56	0.056	JD3	0.50	30.3
Vanadium	11.5		1.4	13.4		2.0	15.3	29.5		1.1	27.8		1.0	5.9
Zinc	1470		29.0	2270		39.1	42.8	71.3		22.6	54.8		20.0	26.2

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 4

Parameter	Sample ID: 112613504			Sample ID: 112613517			RPD	Sample ID: 120213557			Sample ID: 120213570			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	15500		495	15500		503	0.0	15800		437	16200		517	2.5
Antimony	2.6		2.0	3.0		2.0	14.3	4.9		1.7	3.3		2.1	39.0
Arsenic	17.0		2.0	17.4		2.0	2.3	31.4		1.7	17.5		2.1	56.9
Barium	382		2.0	413		2.0	7.8	532		1.7	424		2.1	22.6
Cadmium	68.0		2.0	68.9		2.0	1.3	87.0		1.7	75.8		2.1	13.8
Chromium	803		2.0	866		2.0	7.5	927		1.7	799		2.1	14.8
Copper	479		2.0	501		2.0	4.5	571		1.7	504		2.1	12.5
Iron	25800		495	26600		503	3.1	29300		437	27800		517	5.3
Lead	809		2.0	803		4.0	0.7	904		1.7	887		2.1	1.9
Manganese	293		2.0	315		2.0	7.2	307		1.7	303		2.1	1.3
Nickel	161		2.0	146		2.0	9.8	149		1.7	173		2.1	14.9
Selenium	3.5		2.0	3.0		2.0	15.4	4.2		1.7	3.8		2.1	10.0
Silver	17.2		0.99	17.7		1.0	2.9	15.0		0.87	18.3		1.0	19.8
Vanadium	14.3		2.0	9.3		2.0	42.4	29.5		1.7	28.7		2.1	2.7
Zinc	2140		39.6	2130		40.2	0.5	2470		35.0	2260		41.4	8.9

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 5

Parameter	Sample ID: 111113038			Sample ID: 111113041			RPD	Sample ID: 111913305			Sample ID: 111913307			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	14700	P6	312	14700		289	0.0	19400	P6	384	17900		306	8.0
Antimony	0.29	JD3, M0	1.2	0.38	JD3	1.2	26.9	0.44	JD3, M0	1.5	0.12	JD3	1.2	114.3
Arsenic	12.1		1.2	12.9		1.2	6.4	11.5		1.5	11.1		1.2	3.5
Barium	52		1.2	62.6		1.2	18.5	75.3		1.5	74.8		1.2	0.7
Cadmium	0.16	UD3	1.2	1.6		1.2	163.6	0.23	JD3	1.5	1.5		1.2	146.8
Chromium	24.3		1.2	33.3		1.2	31.3	34.2		1.5	43		1.2	22.8
Copper	33.4		1.2	44.1		1.2	27.6	36.7		1.5	41.6		1.2	12.5
Iron	26800	P6	312	29600		289	9.9	29900	P6	384	27500		306	8.4
Lead	17.9		1.2	34		1.2	62.0	18.5		1.5	41.6		1.2	76.9
Manganese	499	P6	1.2	333		1.2	39.9	513		1.5	454		1.2	12.2
Nickel	36		1.2	43.4		1.2	18.6	45.8		1.5	42.3		1.2	7.9
Selenium	2.4		1.2	2.3		1.2	4.3	2.9		1.5	2.1		1.2	32.0
Silver	0.034	JD3	0.62	0.36	JD3	0.58	165.5	0.12	JD3	0.77	0.24	JD3	0.61	66.7
Vanadium	32.6		1.2	33.5		1.2	2.7	41.6		1.5	38.2		1.2	8.5
Zinc	59.9	M0	24.9	92.5		23.1	42.8	72.2		30.7	92.4		24.5	24.5

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 6

Parameter	Sample ID: 112013358			Sample ID: 112013364			RPD	Sample ID: 120413619			Sample ID: 120413632			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	15900	P6	317	15500		280	2.5	18000	P6	633	18700		551	3.8
Antimony	0.73	JD3, M0	1.3	0.19	JD3	1.1	117.4	2.6	M0	2.5	2.0	JD3	2.2	26.1
Arsenic	10.3		1.3	9.7		1.1	6.0	10		2.5	10.3		2.2	3.0
Barium	58.5		1.3	55.1		1.1	6.0	358		2.5	377		2.2	5.2
Cadmium	0.56	JD3	1.3	0.21	JD3	1.1	90.9	47.0		2.5	48.7		2.2	3.6
Chromium	31.7		1.3	27.2		1.1	15.3	307		2.5	345		2.2	11.7
Copper	30.8		1.3	32.4		1.1	5.1	435		2.5	462		2.2	6.0
Iron	25400	P6	317	24700		280	2.8	25600	P6	633	26400		551	3.1
Lead	16.2		1.3	17.5		1.1	7.7	431	M0	2.5	478		2.2	10.3
Manganese	413		1.3	408		1.1	1.2	329		2.5	341		2.2	3.6
Nickel	38.5		1.3	37.7		1.1	2.1	144		2.5	154		2.2	6.7
Selenium	2.7		1.3	2.4		1.1	11.8	3.3		2.5	3.0		2.2	9.5
Silver	0.31	JD3	0.63	0.045	JD3	0.56	149.3	26.4		1.3	25.5		1.1	3.5
Vanadium	35.6		1.3	33.4		1.1	6.4	24.9		2.5	31.5		2.2	23.4
Zinc	61.4	M0	25.3	87.0		22.4	34.5	1490		50.6	1540		44.1	3.3

Table 2-25. Sediment Method 7471 Field Duplicates Results Summary

Analyte	Sample ID	Dup Sample ID	Result (mg/kg)	Lab Flag	LOQ	RPD
Mercury	FD102813265	102813265	3.2		0.25	
		102813281	2.2		0.21	37.0
	FD102913343	102913343	0.23	M0	0.0080	
		102913348	0.07		0.0063	106.7
	FD110113380	110113390	0.084		0.0073	
		110113392	5.2		0.24	193.6
	FD110413457	110413457	5.5		0.20	
		110413460	6.1		0.20	10.3
	FD111313084	111313084	2.8		0.23	
		111313095	2.6		0.27	7.4
	FD111513201	111513201	2.9		0.27	
		111513208	1.1		0.14	90.0
	FD111813251	111813251	9.4		0.20	
		111813258	12.7		2.1	29.9
	FD112213444	112213444	0.031		0.0070	
		112213446	0.040		0.0065	25.4
	FD112613504	112613504	3.0		0.20	
		112613517	3.6		0.23	18.2

Analyte	Sample ID	Dup Sample ID	Result (mg/kg)	Lab Flag	LOQ	RPD
	FD120213557	120213557	7.0		0.25	
		120213570	3.9		0.21	56.9
	MFD111113038	111113038	0.021		0.0083	
		111113041	0.024		0.0068	13.3
	MFD111913305	111913305	0.024		0.010	
		111913307	0.021		0.0079	13.3
	MFD112013358	112013358	0.020		0.0085	
		112013364	0.022		0.0065	9.5
	MFD120413619	120413619	1.8	P6	0.33	
		120413632	2.7		0.34	40.0

Table 2-26. Sediment 9012 Field Duplicates Results Summary

Analyte	Sample ID	Dup Sample ID	Result (mg/kg)	Lab Flag	LOQ	RPD
Cyanide	FD102813265	102813265	2.9	B	1.2	
		102813281	1.8	B	1.6	46.8
	FD102913343	102913343	0.47	U	0.47	
		102913348	0.72	U	0.72	0.0
	FD110113380	110113390	0.49	U	0.49	
		110113392	4.9		1.1	NC
	FD110413457	110413457	0.82	J	1.2	
		110413460	1.0	J	1.3	19.8
	FD111313084	111313084	4.1		1.7	
		111313095	2.5	J	2.5	48.5
	FD111513201	111513201	20.7		1.9	
		111513208	7.8	M0, R1	0.85	90.5
	FD111813251	111813251	1.9		1.3	
		111813258	3.5		1.8	59.3
	FD112213444	112213444	0.40	U	0.40	
		112213446	0.93	U	0.93	0.0
	FD112613504	112613504	4.5		1.3	
		112613517	4.0		1.7	11.8
	FD120213557	120213557	4.4		1.6	
		120213570	2.8		1.7	44.4
	MFD111113038	111113038	0.28	U	0.88	
		111113041	0.37	J	1.0	27.7
	MFD111913305	111913305	0.28	U	0.88	
		111913307	0.41	U	1.3	37.7
	MFD112013358	112013358	0.24	U	0.76	
		112013364	0.27	U	0.85	11.8
	MFD120413619	120413619	3.1	M0, R1	1.8	
		120413632	2.6		2.2	17.5

Table 2-27. Sediment Lloyd Kahn TOC Field Duplicates Results Summary

Analyte	Sample ID	Dup Sample ID	Result (mg/kg)	Lab Flag	LOQ	RPD
Total Organic Carbon	FD102813265	102813265	143000	B	1000	
		102813281	104000		1000	31.6
	FD102913343	102913343	41500		1000	
		102913348	41700		1000	0.5
	FD110113380	110113390	46300	B	1000	
		110113392	138000	B	1000	99.5
	FD110413457	110413457	97900	B ^	1000	
		110413460	113000	B	1000	14.3
	FD111313084	111313084	123000	B	1000	
		111313095	121000	B	1000	1.6
	FD111513201	111513201	123000	H B	1000	
		111513208	123000	H B	1000	0.0
	FD111813251	111813251	115000	B	1000	
		111813258	85200	B	1000	29.8
	FD112213444	112213444	48200	B	1000	
		112213446	46700	B	1000	3.2
	FD112613504	112613504	134000		1000	
		112613517	116000		1000	14.4
	FD120213557	120213557	123000	B ^	1000	
		120213570	130000	B	1000	5.5
	MFD111113038	111113038	40300		1000	
		111113041	45700		1000	12.6
	MFD111913305	111913305	42000	B	1000	
		111913307	38700	B	1000	8.2
	MFD112013358	112013358	41300	B	1000	
		112013364	40900	B	1000	1.0
	MFD120413619	120413619	93700		1000	
		120413632	94300		1000	0.6

Table 2-28. Percent Moisture Field Duplicates Results Summary TestAmerica

Analyte	Sample ID	Dup Sample ID	Result	Lab Flag	LOQ	RPD
Percent Moisture	FD102813265	102813265	53.9		0.10	
		102813281	49.4		0.10	8.7
	FD102913343	102913343	17.4		0.10	
		102913348	16.7		0.10	4.1
	FD110113380	110113390	15.2		0.10	
		110113392	56.1		0.10	114.7
	FD110413457	110413457	47.3		0.10	
		110413460	47.9		0.10	1.3
	FD111313084	111313084	51.9		0.10	
		111313095	52		0.10	0.2
	FD111513201	111513201	61		0.10	
		111513208	21.5		0.10	95.8
	FD111813251	111813251	39.1		0.10	
		111813258	49.8		0.10	24.1
	FD112213444	112213444	14.0		0.10	
		112213446	13.9		0.10	0.7
	FD112613504	112613504	50.1		0.10	
		112613517	50.4		0.10	0.6
	FD120213557	120213557	51.6		0.10	
		120213570	52.2		0.10	1.2
	MFD111113038	111113038	19.8		0.10	
		111113041	20.2		0.10	2.0
	MFD111913305	111913305	35.2		0.10	
		111913307	30.4		0.10	14.6
	MFD112013358	112013358	21.2		0.10	
		112013364	21.4		0.10	0.9
	MFD120413619	120413619	60.6		0.10	
		120413632	60.7		0.10	0.2

Table 2-28. Percent Solid Field Duplicates Results PACE

Analyte	Sample ID	Dup Sample ID	Result	Lab Flag	LOQ	RPD
Percent Solids	FD102813265	102813265	47.4		0.25	
		102813281	49.3		0.25	3.9
	FD102913343	102913343	82.4		0.25	
		102913348	83.5		0.25	1.3
	FD110113380	110113390	86.4		0.25	
		110113392	45.1		0.25	62.8
	FD110413457	110413457	51.1		0.25	
		110413460	52.4		0.25	2.5
	FD111313084	111313084	47.8		0.25	
		111313095	52.7		0.25	9.8
	FD111513201	111513201	38.4		0.25	
		111513208	38.3		0.25	0.3
	FD111813251	111813251	56.8		0.25	
		111813258	49.6		0.25	13.5
	FD112213444	112213444	86.5		0.25	
		112213446	86.9		0.25	0.5
	FD112613504	112613504	50.3		0.25	
		112613517	50.2		0.25	0.2
	FD120213557	120213557	48.8		0.25	
		120213570	48.1		0.25	1.4
	MFD111113038	111113038	80.3		0.25	
		111113041	80.5		0.25	0.2
	MFD111913305	111913305	79.8		0.25	
		111913307	77.8		0.25	2.5
	MFD112013358	112013358	79.4		0.25	
		112013364	79.7		0.25	0.4
	MFD120413619	120413619	40.1		0.25	
		120413632	39.4		0.25	1.8

3.0 ORGANIC DATA REVIEW

Blank, spiked, and duplicate results were provided. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples. Ottawa sand was used as the matrix for VOC method blank analysis for sediment samples and organic free water was used as the method blank for water samples. Sodium sulfate was used as the matrix for method blanks for the semivolatile organics (PNAs, PCBs, Phenols, and SVOCs) analyses for the sediment samples and organic free water was used as the method blank for water samples.

Sediment samples were analyzed for organic compounds following SW-846 Methods or laboratory developed methods as shown in Table 3-1.

Table 3-1. Organic Analytes and Methods Summary

Analytical Method	Analyte
EPA 8260B	Purgeable Volatile Organic Compounds (PVOC)
EPA 8270C	Semivolatile Organic Compounds (SVOC)
EPA 8270C-SIM	Polycyclic Aromatic Hydrocarbons (PAHs)
EPA 8082	PCBs
Alkylated PAH by SIM	Alkylated PAHs

3.1 SW-846 Method 8260B – Purgeable Volatile Organic Compounds

3.1.1 Summary

SW-846 Method 8260B employs gas chromatographic separation with a mass spectrometer as a detector.

Sample 110113376MS was received with the vial septa reversed which prevented an airtight seal. Therefore, results for this sample will be qualified as estimated (“J”) or (“UJ”).

3.1.2 Method Blanks

The sediment samples were analyzed in 24 analytical batches for sediments. The aqueous samples (trip blanks) were analyzed in 11 analytical batches. One sediment sample batch had benzene and toluene detected above the reporting limit, in addition ethylbenzene, xylenes (total) and 1,2,4-trimethylbenzene were detected between the MDL and reporting limit. All associated samples in which these analytes are detected above the MDL and below five times the blank value will be qualified as estimated (“J”). Sample results greater than five times the blank value or non-detect will not be qualified.

The method blank data are summarized in Tables 3-2 and 3-3.

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 145790	QC Batch: 145943	QC Batch: 146030	QC Batch: 146371	QC Batch: 146516	QC Batch: 146521	QC Batch: 146524	QC Batch: 147224	QC Batch: 147429
1,2,4-Trimethylbenzene	9.5 U	10.2 J	9.5 U						
1,3,5-Trimethylbenzene	13.4 U								
Benzene	7.3 U	22.2	7.3 U						
Ethylbenzene	8.9 U	14.1 J	8.9 U						
Toluene	15.5 U	121	15.5 U						
Xylene (Total)	39.2 U	59.1 J	39.2 U						

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg) Cont 1

Parameter	QC Batch: 147482	QC Batch: 147662	QC Batch: 147989	QC Batch: 147996	QC Batch: 148138	QC Batch: 148255	QC Batch: 148418	QC Batch: 148593	QC Batch: 148883
1,2,4-Trimethylbenzene	9.5 U								
1,3,5-Trimethylbenzene	13.4 U								
Benzene	7.3 U								
Ethylbenzene	8.9 U								
Toluene	15.5 U								
Xylene (Total)	39.2 U								

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg) Cont 2

Parameter	QC Batch: 148945	QC Batch: 149038	QC Batch: 149245	QC Batch: 149392	QC Batch: 149523	QC Batch: 149829
1,2,4-Trimethylbenzene	9.5 U					
1,3,5-Trimethylbenzene	13.4 U					
Benzene	7.3 U					
Ethylbenzene	8.9 U					
Toluene	15.5 U					
Xylene (Total)	39.2 U					

Table 3-3. Water Method 8260 Method Blank Results Summary (µg/L)

Parameter	QC Batch: 200- 63941	QC Batch: 200- 64060	QC Batch: 200- 64525	QC Batch: 200- 64717	QC Batch: 200- 65166	QC Batch: 200- 65230
1,2,4-Trimethylbenzene	0.20 U					
1,3,5-Trimethylbenzene	0.18 U					
Benzene	0.17 U					
Ethylbenzene	0.18 U					
m&p-Xylene	0.36 U					
o-Xylene	0.17 U					
Toluene	0.17 U					
Xylenes, Total	0.17 U					

Table 3-3. Water Method 8260 Method Blank Results Summary (µg/L) Cont

Parameter	QC Batch: 200- 65297	QC Batch: 200- 65502	QC Batch: 200- 65582	QC Batch: 200- 65782	QC Batch: 200- 66095
1,2,4-Trimethylbenzene	0.20 U				
1,3,5-Trimethylbenzene	0.18 U				
Benzene	0.17 U				
Ethylbenzene	0.18 U				
m&p-Xylene	0.36 U				
o-Xylene	0.17 U				
Toluene	0.17 U				
Xylenes, Total	0.17 U				

3.1.3 Trip Blanks, Field Blanks, Equipment Blanks

Twelve trip blanks were provided with this sample set. None of the trip blanks associated with these samples gave results above the detection limit.

Twenty three equipment blanks were also collected and submitted for analysis. None of the equipment blanks associated with these samples gave results above the detection limit. No data for Method 8260 will be qualified based on trip blanks or equipment blanks.

3.1.4 Calibration

All initial calibration criteria were met for all compounds. All analytes fit first order linear regression curves and gave average response factors (RFs) with <15% RSD over the average. Therefore average RFs were used in sample quantitation. No data are qualified as a result of the initial calibration data.

For evaluating calibration verifications, the June 2008 CLP National Functional Guidelines have established a $\pm 40\%$ drift or difference acceptability criterion for analytes known to exhibit poor response and a $\pm 25\%$ drift or difference criterion for all other target analytes. None of the analytes of concern in this investigation are considered to exhibit poor response. The calibration verification associated with this data set did not exceed the $\pm 25\%$ difference criterion in place for all other target analytes. Consequently, no data are qualified as a result of the calibration verification data.

3.1.5 Surrogate Compound Recoveries

For analyses performed by Pace, three surrogate compounds, 4-bromofluorobenzene, toluene- d_8 , and dibromofluoromethane were spiked into each sediment field sample to monitor analyte recovery in the analytical system. For aqueous sample analyses performed by TestAmerica, four surrogate compounds, 1,2-dichlorobenzene- d_4 , 1,2-dichloroethane- d_4 , bromofluorobenzene, and toluene- d_8 were spiked into each aqueous field sample to monitor analyte recovery in the analytical system. The surrogates used by each laboratory are acceptable to measure recovery under EPA SW-846 guidance for this analytical method.

In some cases surrogate compound recoveries are not within specified recovery range due to sample dilution as a consequence of high analyte concentrations or high amounts of non-target analytes present in the samples. In these cases, the laboratory appended their qualifier to indicate dilution as the cause for the low recovery. Sample dilution, when warranted, is not cause to further qualify sample results.

Many other sediment samples gave recoveries below limits used by the laboratory. In these cases the failed recovery is not associated with a sample dilution. For these samples with dilutions less than 5x, positive results are qualified as estimated ("J"), and non-detects as ("UJ")

Recoveries for all surrogates for all samples are presented in Tables 3-4 and 3-5.

Table 3-4. Sediment Method 8260 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene- <i>d</i> ₈	
			Limits:	49	130	57	130	54
4087646001	102813264	1	57		66		61	
4087646002	102813265	1	59		69		64	
4087646003	102813266	1	51		66		58	
4087646004	102813273	1	50		64		58	
4087646005	102813277	1	79		96		85	
4087646006	102813281	1	54		64		59	
4087646007	102813282	1	54		69		62	
4087646008	102813283	1	50		64		57	
4087646009	102813284	1	57		68		62	
4087646010	102813287	4	84		78	D3	87	
4087646011	102813288	1	65		73		67	
4087646012	102913291	1	55		62		58	
4087646013	102913292	1	54		62		58	
4087646014	102913293	1	63		66		64	
4087646015	102913299	2.5	68		67	D3	70	
4087646016	102913300	8	65		63	D3	67	
4087646017	102913301	2.5	61		59	D3	60	
4087646018	102913306	2	69		73	D3	72	
4087646019	102913308	1	53		58		54	
4087646020	102913309	1	54		57		52	1q
4087646021	102913310	1	49		48	S1	44	S1
4087646022	102913313	1	52		54	1q	50	1q
4087646023	102913317	20	0	S4	0	D3, S4	0	S4
4087646024	102913325	2	68		79		76	
4087646025	102913327	1	47	1q	59		52	1q
4087646026	102913328	1	35	1q	52	1q	41	1q
4087646027	102913329	1	50		62		56	
4087646028	102913338	1	45	1q	59		50	1q
4087646029	102913343	4	76		84	D3	80	
4087646030	102913348	4	68		76	D3	75	
4087646031	102913349	1	66		80		72	
4087646032	102913350	1	56		71		59	
4087646033	102913351	1	53		66		59	
4087646034	102913355	20	0	S4	0	D3, S4	0	S4
4087646035	102913361	20	0	S4	0	D3, S4	0	S4
4088053001	110113375	1	39	S1	56	S1	49	S1

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene- d_8	
4088053002	110113376	1	36	S1	44	S1	36	S1
4088053003	110113377	1	36	S1	50	S1	43	S1
4088053004	110113380	1	48	S1	61		51	S1
4088053005	110113386	10	56		63	D3	59	
4088053006	110113389	5	53		58	D3	54	
4088053007	110113390	1	85		88		91	
4088053008	110113392	1	47	S1	60		52	S1
4088053009	110113393	1	60		67		67	
4088053010	110113394	1	63		71		65	
4088053011	110113395	1	68		71		61	
4088053012	110113399	2	61		68	D3	63	
4088053013	110113406	10	77		89	D3	84	
4088053014	110113408	1	85		88		87	
4088053015	110113410	1	63		70		68	
4088053016	110113411	1	57		67		61	
4088053017	110113412	1	57		67		62	
4088053018	110113424	1	67		74		69	
4088053019	110113429	1	67		69		70	
4088053020	110413432	1	61		61		64	
4088053021	110413433	1	57		60		61	
4088053022	110413434	1	56		63		60	
4088053023	110413441	80	0	S4	0	D3, S4	0	S4
4088053024	110413443	2.5	95		90		99	
4088053025	110413448	1	43	S1	58		49	S1
4088053026	110413449	1	60		67		64	
4088053027	110413450	1	57		67		64	
4088053028	110413457	80	0	S4	0	D3, S4	0	S4
4088053029	110413458	2.5	91		90		97	
4088053030	110413460	4	77		66		74	
4088053031	110413461	1	59		59		58	
4088053032	110413462	1	55		63		60	
4088053033	110413463	1	48	S0	58		54	
4088053034	110413466	1	56		65		61	
4088053035	110413470	80	0	S4	0	D3, S4	0	S4
4088053036	110413471	1	98		95		100	
4088482001	110813001	1	50		55	4q	49	4q
4088482002	110813002	1	48	S1	55	S1	48	S1
4088482003	110813003	1	49		55	4q	48	4q
4088482004	110813017	2	52		60	D3	52	4q

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene-d ₈	
4088482005	110813019	2	59		63	D3	56	
4088482006	110813020	1	81		80		78	
4088482008	111113024	1	49		52	4q	48	4q
4088482009	111113025	1	52		59		53	4q
4088482010	111113026	1	47	4q	52	4q	48	4q
4088482011	111113030	1	52		55	4q	49	4q
4088482012	111113034	1	63		66		60	
4088482013	111113038	1	80		84		80	
4088482014	111113041	1	78		86		81	
4088482015	111213043	1	51		62		57	
4088482016	111213044	1	48	4q	58		54	
4088482017	111213045	1	48	4q	59		53	4q
4088482018	111213062	1	56		67		58	
4088482019	111213063	1	79		89		83	
4088482020	111213064	1	79		85		82	
4088486001	110813504	1	62		69		63	
4088486002	110813505	1	61		67		62	
4088486003	110813506	1	59		68		60	
4088486004	110813510	1	64		70		63	
4088486005	110813515	40	0	S4	0	D3, S4	0	S4
4088486006	110813517	1	82		90		82	
4088486007	110813518	1	82		87		80	
4088622001	111313070	1	44	1q	52	1q	46	1q
4088622002	111313071	1	45	2q	57		50	2q
4088622003	111313072	1	50		61		53	2q
4088622004	111313084	1	74		80		73	
4088622005	111313085	10	67		78	D3	69	
4088622006	111313087	1	73		80		73	
4088622007	111313092	1	83		92		84	
4088622008	111313095	1	81		85		80	
4088622009	111313096	1	47	2q	57		51	2q
4088622010	111313097	1	50		63		53	2q
4088622011	111313098	1	47	2q	59		51	2q
4088622012	111313110	1	63		71		64	
4088622013	111313114	1	83		90		83	
4088622014	111413118	1	53		67		58	
4088622015	111413119	1	56		65		59	
4088622016	111413120	1	53		61		54	
4088622017	111413134	1	54		65		55	

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene-d ₈	
4088622018	111413137	1	79		87		78	
4088622019	111413139	1	55		64		58	
4088622020	111413140	1	47	2q	56	2q	49	2q
4088622021	111413141	1	59		69		61	
4088622022	111413153	2	55		63	D3	56	
4088622023	111413154	5	68		71	D3	67	
4088622024	111413155	1	77		87		76	
4088879001	111513159	1	40	5q	50	5q	44	5q
4088879002	111513160	1	45	5q	54	5q	46	5q
4088879003	111513161	1	43	5q	56	5q	45	5q
4088879004	111513178	1	46	5q	55	5q	47	5q
4088879005	111513179	1	65		71		63	
4088879006	111513182	1	47	5q	58		48	5q
4088879007	111513183	1	39	S1	49	S1	41	S1
4088879008	111513184	2	39	5q	51	5q, D3	41	5q
4088879009	111513187	25	0	S4	0	D3, S4	0	S4
4088879010	111513192	125	0	S4	0	D3, S4	0	S4
4088879011	111513193	10	75		67	D3	69	
4088879012	111513194	1	112		119		108	
4088879013	111513199	1	40	3q	43	4q	41	3q
4088879014	111513200	1	49		58		50	5q
4088879015	111513201	1	42	6q	46	6q	41	6q
4088879016	111813210	1	45	6q	46	6q	45	7q
4088879017	111813211	1	43	6q	47	6q	43	6q
4088879018	111813212	1	45	6q	48	6q	46	6q
4088879019	111813220	4	78		65	D3	69	
4088879020	111813221	1	73		71		72	
4088879021	111813223	1	82		69		74	
4088879022	111813224	1	46	6q	49	6q	44	6q
4088879023	111813225	1	47	6q	50	6q	47	6q
4088879024	111813235	10	55		57	D3	50	6q
4088879025	111813236	10	48	6q	50	6q	46	6q
4088879026	111813237	1	69		72		71	
4088879027	111813239	1	44	6q	47	6q	44	6q
4088879028	111813240	1	44	6q	49	6q	46	6q
4088879029	111813241	1	50		56	6q	51	6q
4088879030	111813251	20	0	S4	0	D3, S4	0	S4
4088879031	111813252	1	56		61		55	
4088879032	111813258	20	0	S4	0	D3, S4	0	S4

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene-d ₈	
4088879033	111913260	1	55		60		60	
4088879034	111913261	1	52		57		56	
4088879035	111913262	1	53		57		56	
4088879036	111913274	5	56		58	D3	54	
4088879037	111913276	1	81		83		82	
4088879038	111913279	1	50		55	8q	52	8q
4088879039	111913280	1	49		55	8q	51	8q
4088879040	111913281	1	52		59		54	
4088879041	111913292	10	53		59	D3	53	8q
4088879042	111913293	1	75		75		75	
4088879043	111913298	1	70		70		71	
4088879044	111913299	1	75		74		76	
4088879045	111913300	1	76		74		75	
4088879046	111913305	1	81		85		83	
4088879047	111913307	1	75		77		77	
4088879048	111513208	1	49		53	2q	49	2q
4089023001	112013310	1	49		50	5q	50	5q
4089023002	112013311	1	48	4q	53	4q	52	4q
4089023003	112013312	1	47	5q	53	5q	52	5q
4089023004	112013318	1	57		59		55	
4089023005	112013327	8	57		63	D3	54	
4089023006	112013328	5	80		85	D3	83	
4089023007	112013331	1	45	S1	48	S1	47	S1
4089023008	112013332	1	54		57		53	6q
4089023009	112013333	1	51		59		56	
4089023010	112013340	1	41	6q	51	6q	43	6q
4089023011	112013343	50	0	S4	0	D3, S4	0	S4
4089023012	112013344	1	79		79		81	
4089023013	112013346	1	84		79		83	
4089023014	112013347	1	84		81		85	
4089023015	112013348	1	71		71		70	
4089023016	112013358	1	81		80	3q	82	
4089023017	112013364	20	0	S4	0	D3, S4	0	S4
4089023018	112113366	1	51		57		53	6q
4089023019	112113367	1	55		62		57	
4089023020	112113368	1	55		61		58	
4089023021	112113371	1	66		67		66	
4089023022	112113382	25	0	S4	0	D3, S4	0	S4
4089023023	112113383	1	76		78		77	

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene- d_8	
4089023024	112113385	1	63		63		63	
4089023025	112113386	1	53		59		57	
4089023026	112113387	1	48	7q	57		54	
4089023027	112113389	1	46	S1	57		50	S1
4089023028	112113399	1	55		66		56	
4089023029	112113400	1	87		92		85	
4089202001	112213406	1	54		53	1q	52	1q
4089202002	112213407	1	54		57		54	
4089202003	112213408	1	58		56	1q	58	
4089202004	112213422	20	0	S4	0	D3, S4	0	S4
4089202005	112213423	1	90		80		83	
4089202006	112213424	1	92		82		86	
4089202007	112213425	1	55		54	S1	54	
4089202008	112213426	1	50		52	1q	51	1q
4089202009	112213427	1	61		60		58	
4089202010	112213443	1	64		60		56	
4089202011	112213444	1	90		79		83	
4089202012	112213446	1	90		79		80	
4089202013	112213447	1	56		65		63	
4089202014	112213448	1	53		64		59	
4089202015	112213449	1	53		64		58	
4089202016	112213450	1	57		65		60	
4089202017	112513452	1	50		60		56	
4089202018	112513453	1	53		61		58	
4089202019	112513454	1	57		65		60	
4089202020	112513466	25	0	S4	0	D3, S4	0	S4
4089202021	112513467	25	0	S4	0	D3, S4	0	S4
4089202022	112513468	1	81		86		83	
4089202023	112513469	1	82		85		83	
4089202024	112513473	1	54		60		57	
4089202025	112513474	1	57		66		59	
4089202026	112513475	1	53		59		56	
4089202027	112513485	1	63		69		64	
4089202028	112513486	1	81		83		83	
4089362001	112613490	1	46	S1	51	S1	49	S1
4089362002	112613491	1	48	3q	52	3q	49	3q
4089362003	112613492	1	52		55	3q	52	3q
4089362004	112613503	1	60		63		58	
4089362005	112613504	40	0	S4	0	D3, S4	0	S4

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene-d ₈	
4089362006	112613505	25	0	S4	0	D3, S4	0	S4
4089362007	112613506	1	75		76		77	
4089362008	112613517	40	0	S4	0	D3, S4	0	S4
4089509001	120213522	1	48	4q	56	4q	52	4q
4089509002	120213523	1	46	S1	55	S1	51	S1
4089509003	120213524	1	51		58		54	
4089509004	120213532	1	58		63		57	
4089509005	120213535	8	71		78	D3	75	
4089509006	120213545	1	49		55	3q	53	3q
4089509007	120213546	1	49		55	3q	52	3q
4089509008	120213547	1	48	3q	55	3q	52	3q
4089509009	120213557	40	0	S4	0	D3, S4	0	S4
4089509010	120213558	40	0	S4	0	D3, S4	0	S4
4089509011	120213559	40	0	S4	0	D3, S4	0	S4
4089509012	120213560	1	81		82		83	
4089509013	120213570	50	0	S4	0	D3, S4	0	S4
4089509014	120313572	1	48	3q	56	3q	53	3q
4089509015	120313573	1	52		58		56	
4089509016	120313574	1	57		63		60	
4089509017	120313581	10	60		64	D3	62	
4089509018	120313582	4	75		79	D3	74	
4089509019	120313588	1	48	S1	55	S1	50	S1
4089509020	120313589	1	52		59		53	3q
4089509021	120313590	1	52		57		53	3q
4089509022	120313602	50	0	S4	0	D3, S4	0	S4
4089509023	120313603	20	0	S4	0	D3, S4	0	S4
4089509024	120313604	1	77		81		79	
4089665001	120413617	1	47	1q	54	1q	53	1q
4089665002	120413618	1	51		58		57	
4089665003	120413619	1	56		61		57	
4089665004	120413629	10	63		69	D3	60	
4089665005	120413630	1	75		77		77	
4089665006	120413632	1	52		57		54	
4089665007	120413633	1	56		57		56	
4089665008	120413634	5	69		68	D3	66	
4089665009	120413635	1	60		64		61	
4089665010	120413641	1	75		73		73	
4089665011	120413642	1	77		75		78	
4089665012	120413645	1	78		75		78	

Lab Sample Number	Field ID	Dilution	4-Bromo-fluorobenzene		Dibromo-fluoromethane		Toluene- d_8	
4089665013	120413646	1	82		80		81	
4089665014	120413653	10	59		66	D3	60	
4089665015	120413654	1	83		81		85	
4089818001	120613845	1	55		58		53	1q
4089818002	120613846	1	73		75		71	
4089818003	120613847	1	74		72		71	
4089818004	120613851	1	60		62		57	
4089818005	120613859	4	55		60	D3	54	
4089818006	120613860	1	78		79		77	

Table 3-5. Water Method 8260 Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	1,2-Dichloro-benzene- d_4		1,2-Dichloro-ethane- d_4		Bromo-fluorobenzene		Toluene- d_8	
			Limits:	75	120	80	120	80	125	80
200-19227-36	102813262	1	101		96		101		95	
200-19227-37	102813263	1	98		95		98		95	
200-19227-38	102913290	1	100		97		101		95	
200-19267-1	103013363	1	98		95		99		95	
200-19267-2	103013364	1	98		96		99		95	
200-19364-1	110113373	1	99		95		100		94	
200-19364-2	110113374	1	97		95		99		95	
200-19364-3	110413431	1	100		97		100		94	
200-19364-4	110513474	1	96		96		97		95	
200-19434-1	110713490	1	103		97		105		98	
200-19434-2	110713491	1	102		95		105		98	
200-19557-1	110813502	1	106		100		113		101	
200-19557-2	110813503	1	96		93		102		93	
200-19557-3	111113023	1	101		97		106		96	
200-19557-4	111213042	1	98		94		105		95	
200-19664-1	111513157	1	103		100		108		97	
200-19664-2	111513158	1	103		98		107		99	
200-19664-3	111813209	1	103		96		107		96	
200-19664-4	111913259	1	103		98		107		98	
200-19709-1	112013308	1	105		101		112		100	
200-19709-2	112013309	1	104		99		111		100	
200-19709-3	112113365	1	105		100		113		100	

Lab Sample Number	Field ID	Dilution	1,2-Dichlorobenzene- <i>d</i> ₄	1,2-Dichloroethane- <i>d</i> ₄	Bromo-fluorobenzene	Toluene- <i>d</i> ₈
200-19777-1	112213404	1	107	100	113	98
200-19777-2	112213405	1	105	100	111	101
200-19777-3	112513451	1	104	97	109	96
200-19822-10	120213519	1	104	99	111	100
200-19822-9	120213518	1	108	102	114	101
200-19876-1	120213520	1	102	99	108	97
200-19876-2	120213521	1	103	98	109	97
200-19876-3	120313571	1	105	101	111	98
200-19939-1	120413615	1	104	98	109	97
200-19939-2	120413616	1	105	98	110	97
200-19939-3	120513657	1	106	100	113	100
200-20035-1	120613843	1	97	95	109	96
200-20035-2	120613844	1	103	98	113	99

3.1.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed for multiple samples as specified by the project team in accordance with the Sampling and Analysis Plan. The spike solution used by the laboratory does not contain 1,2,4-trimethylbenzene or 1,3,5-trimethylbenzene. Therefore there are no spike results for the LCS or MS/MSD for these analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The MS/MSD results are summarized in Table 3-6.

Table 3-6. Sediment Method 8260 MS/MSD Recoveries

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
102813277	Benzene	2920	2280	78	2920	2250	77	1	12.4 JB	20
	Ethylbenzene	2920	2330	78	2920	2820	95	19	53.9 JB	20
	Toluene	2920	2330	79	2920	2290	78	2	18.2 U	20
	Xylene (Total)	8770	6820	77	8770	7110	80	4	66.5 JB	20
110113376	Benzene	5880	3320	56	5880	2770	47	18	17.1 U	20
	Ethylbenzene	5880	2190	37	5880	2440	41	11	27.4 J	20
	Toluene	5880	2670	43	5880	2610	42	2	143	20
	Xylene (Total)	17600	6370	35	17600	7020	39	10	137 J	20
110413458	Benzene	2840	18400	178	2840	17700	155	4	13300 M1	20
	Ethylbenzene	2840	3540	111	2840	2830	86	22	393 R1	20
	Toluene	2840	2910	98	2840	2590	86	12	139 J	20
	Xylene (Total)	8530	8180	93	8530	7660	87	7	225 J	20
111113038	Benzene	3120	2910	92	3120	2940	93	1	52.4	20
	Ethylbenzene	3120	2620	84	3120	2690	86	3	11.0 U	20
	Toluene	3120	2680	85	3120	2730	87	2	27.0 J	20
	Xylene (Total)	9360	7970	85	9360	8100	87	2	48.9 U	20
111313092	Benzene	2920	2960	101	2920	2940	101	0	8.5 U	20
	Ethylbenzene	2920	2650	91	2920	2630	90	1	10.3 U	20
	Toluene	2920	2710	93	2920	2700	93	0	18.1 U	20
	Xylene (Total)	8760	7910	90	8760	7940	91	0	45.8 U	20
111513200	Benzene	6920	3940	57	6920	4150	60	5	20.2 U	20
	Ethylbenzene	6920	3080	44	6920	3430	50	11	24.5 U	20
	Toluene	6920	3450	49	6920	3830	55	11	46.3 J	20
	Xylene (Total)	20800	9010	43	20800	10300	49	14	113 J	20
111813252	Benzene	3130	2590	75	3130	2550	74	1	234	20
	Ethylbenzene	3130	1980	62	3130	1880	59	5	51.1 J	20
	Toluene	3130	2000	64	3130	1920	61	4	19.4 U	20
	Xylene (Total)	9390	5900	62	9390	5600	59	5	49.1 U	20
111913305	Benzene	3860	3320	86	3860	3290	85	1	11.2 U	20
	Ethylbenzene	3860	3420	88	3860	3360	87	2	16.0 J	20
	Toluene	3860	3520	91	3860	3430	89	2	24.0 U	20
	Xylene (Total)	11600	10300	89	11600	10100	87	2	60.6 U	20
112013358	Benzene	3300	3040	91	3300	3280	90	8	26.7	20
	Ethylbenzene	3300	2960	89	3300	3230	89	9	11.2 U	20
	Toluene	3300	3020	91	3300	3340	92	10	19.7 U	20
	Xylene (Total)	9920	8920	90	9920	9830	91	10	49.8 U	20

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
112213427	Benzene	6750	4080	60	6750	4230	63	3	19.7 U	20
	Ethylbenzene	6750	3810	56	6750	3780	56	1	23.9 U	20
	Toluene	6750	4130	60	6750	4300	62	4	98.9 J	20
	Xylene (Total)	20300	11500	57	20300	11500	57	0	106 U	20
112613492	Benzene	6210	3760	61	6210	3830	62	2	18.1 U	20
	Ethylbenzene	6210	3550	57	6210	3560	57	0	22.0 U	20
	Toluene	6210	3950	62	6210	3980	63	1	87.1 J	20
	Xylene (Total)	18600	10700	58	18600	10900	58	1	97.5 U	20
120213560	Benzene	3150	2780	88	3150	2980	94	7	21.0 J	20
	Ethylbenzene	3150	2840	89	3150	2900	91	2	40.2 J	20
	Toluene	3150	2800	89	3150	2860	91	2	19.5 U	20
	Xylene (Total)	9440	8270	87	9440	8440	89	2	49.4 U	20
120413619	Benzene	6340	3920	62	6340	4190	66	7	18.5 U	20
	Ethylbenzene	6340	3410	54	6340	3340	53	2	22.5 U	20
	Toluene	6340	3800	59	6340	3880	60	2	46.9 J	20
	Xylene (Total)	19000	10300	54	19000	10000	53	2	99.6 U	20

3.1.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed on each day of analysis and for each analytical batch. None of the analytes recovered outside of the acceptance limits established by the laboratory. The spike solution used by the laboratory does not contain 1,2,4-Trimethylbenzene or 1,3,5-Trimethylbenzene. Therefore there are no spike results for the LCS or MS/MSD for these analytes. No data are qualified due to failed LCS recoveries. The LCS results are summarized in Tables 3-7 and 3-8.

Table 3-7. Sediment Method 8260 LCS Results

Parameter	Rec Limits (%)		QC Batch: 145790			QC Batch: 145943			QC Batch: 146030		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2220	89	2500	2320	93	2500	2330	93
Ethylbenzene	65	137	2500	2510	100	2500	2550	102	2500	2500	100
Toluene	70	130	2500	2530	101	2500	2540	102	2500	2490	99
Xylene (Total)	65	138	7500	7590	101	7500	7630	102	7500	7470	100

Table 3-7. Sediment Method 8260 LCS Results Cont 1

Parameter	Rec Limits (%)		QC Batch: 146371			QC Batch: 146516			QC Batch: 146521		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2150	86	2500	2900	116	2500	2640	106
Ethylbenzene	65	137	2500	2550	102	2500	2650	106	2500	2580	103
Toluene	70	130	2500	2520	101	2500	2620	105	2500	2640	106
Xylene (Total)	65	138	7500	7620	102	7500	7870	105	7500	7870	105

Table 3-7. Sediment Method 8260 LCS Results Cont 2

Parameter	Rec Limits (%)		QC Batch: 146524			QC Batch: 147224			QC Batch: 147429		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2150	86	2500	2600	104	2500	2740	110
Ethylbenzene	65	137	2500	2530	101	2500	2430	97	2500	2590	104
Toluene	70	130	2500	2540	102	2500	2460	99	2500	2650	106
Xylene (Total)	65	138	7500	7680	102	7500	7510	100	7500	7930	106

Table 3-7. Sediment Method 8260 LCS Results Cont 3

Parameter	Rec Limits (%)		QC Batch: 147482			QC Batch: 147662			QC Batch: 147989		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2850	114	2500	2730	109	2500	2680	107
Ethylbenzene	65	137	2500	2570	103	2500	2510	100	2500	2510	100
Toluene	70	130	2500	2650	106	2500	2540	102	2500	2580	103
Xylene (Total)	65	138	7500	7860	105	7500	7690	103	7500	7620	102

Table 3-7. Sediment Method 8260 LCS Results Cont 4

Parameter	Rec Limits (%)		QC Batch: 147996			QC Batch: 148138			QC Batch: 148255		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2000	80	2500	2540	102	2500	2650	106
Ethylbenzene	65	137	2500	1770	71	2500	2620	105	2500	2650	106
Toluene	70	130	2500	1790	72	2500	2700	108	2500	2720	109
Xylene (Total)	65	138	7500	5390	72	7500	7990	107	7500	8030	107

Table 3-7. Sediment Method 8260 LCS Results Cont 5

Parameter	Rec Limits (%)		QC Batch: 148418			QC Batch: 148593			QC Batch: 148883		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2650	106	2500	2650	106	2500	2620	105
Ethylbenzene	65	137	2500	2720	109	2500	2650	106	2500	2670	107
Toluene	70	130	2500	2800	112	2500	2710	108	2500	2750	110
Xylene (Total)	65	138	7500	8290	110	7500	8090	108	7500	8140	109

Table 3-7. Sediment Method 8260 LCS Results Cont 6

Parameter	Rec Limits (%)		QC Batch: 148945			QC Batch: 149038			QC Batch: 149245		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2180	87	2500	2640	106	2500	2630	105
Ethylbenzene	65	137	2500	2560	102	2500	2700	108	2500	2670	107
Toluene	70	130	2500	2530	101	2500	2770	111	2500	2750	110
Xylene (Total)	65	138	7500	7630	102	7500	8170	109	7500	8160	109

Table 3-7. Sediment Method 8260 LCS Results Cont 7

Parameter	Rec Limits (%)		QC Batch: 149392			QC Batch: 149523			QC Batch: 149829		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2640	106	2500	2740	110	2500	2590	104
Ethylbenzene	65	137	2500	2690	108	2500	2710	108	2500	2670	107
Toluene	70	130	2500	2750	110	2500	2800	112	2500	2740	110
Xylene (Total)	65	138	7500	8100	108	7500	8260	110	7500	8150	109

Table 3-8. Water Method 8260 LCS Summary

Parameter	Rec Limits (%)		QC Batch: 200-63941			QC Batch: 200-64060			QC Batch: 200-64525		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	25.6	103	25.0	25.0	100	25.0	25.6	102
1,3,5-Trimethylbenzene	80	120	25.0	25.3	101	25.0	25.1	100	25.0	25.5	102
Benzene	80	125	25.0	25.6	102	25.0	25.3	101	25.0	25.0	100
Ethylbenzene	80	125	25.0	25.2	101	25.0	25.0	100	25.0	26.0	104
m&p-Xylene	80	125	50.0	51.1	102	50.0	50.2	100	50.0	51.7	103
o-Xylene	80	120	25.0	25.3	101	25.0	24.9	100	25.0	26.0	104
Toluene	80	120	25.0	25.9	104	25.0	25.4	102	25.0	25.7	103

Table 3-8. Water Method 8260 LCS Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 200-64717			QC Batch: 200-65166			QC Batch: 200-65230		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	26.4	105	25.0	25.3	101	25.0	25.2	101
1,3,5-Trimethylbenzene	80	120	25.0	26.4	105	25.0	25.5	102	25.0	25.2	101
Benzene	80	125	25.0	25.8	103	25.0	24.7	99	25.0	24.6	98
Ethylbenzene	80	125	25.0	26.5	106	25.0	25.9	104	25.0	24.9	99
m&p-Xylene	80	125	50.0	53.3	107	50.0	52.5	105	50.0	49.8	100
o-Xylene	80	120	25.0	26.6	106	25.0	26.2	105	25.0	24.9	100
Toluene	80	120	25.0	26.1	105	25.0	26.0	104	25.0	24.7	99

Table 3-8. Water Method 8260 LCS Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 200-65297			QC Batch: 200-65502			QC Batch: 200-65582		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	24.9	100	25.0	25.9	104	25.0	24.7	99
1,3,5-Trimethylbenzene	80	120	25.0	25.0	100	25.0	26.3	105	25.0	25.0	100
Benzene	80	125	25.0	24.1	96	25.0	25.0	100	25.0	24.6	98
Ethylbenzene	80	125	25.0	24.6	98	25.0	25.9	104	25.0	25.2	101
m&p-Xylene	80	125	50.0	49.2	98	50.0	51.7	103	50.0	50.7	101
o-Xylene	80	120	25.0	24.6	98	25.0	25.8	103	25.0	25.2	101
Toluene	80	120	25.0	24.2	97	25.0	25.7	103	25.0	24.7	99

Table 3-8. Water Method 8260 LCS Summary Cont 3

Parameter	Rec Limits (%)		QC Batch: 200-65782			QC Batch: 200-66095		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	25.7	103	25.0	24.4	98
1,3,5-Trimethylbenzene	80	120	25.0	26.0	104	25.0	25.9	103
Benzene	80	125	25.0	24.4	98	25.0	25.1	100
Ethylbenzene	80	125	25.0	25.5	102	25.0	26.2	105
m&p-Xylene	80	125	50.0	50.8	102	50.0	51.9	104
o-Xylene	80	120	25.0	25.4	102	25.0	25.8	103
Toluene	80	120	25.0	24.8	99	25.0	25.6	102

3.1.8 Field Duplicates

Field duplicates generally exhibited good agreement for most of analytes with all RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. Some results exceed twice the limit of quantitation. Therefore, the failed analytes in the sample and duplicate only, will be qualified as estimated ("J"). The results of the field duplicate analyses are given in Table 3-9.

Table 3-9. Sediment Method 8260 Field Duplicate Results

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	145		108	113		98.9	24.8	659		242	917		240	32.7
1,3,5-Trimethylbenzene	60.2	J	108	43.1	J	98.9	33.1	101	J	242	179	J	240	55.7
Benzene	15.8	U	43.4	14.4	U	39.6	0.0	4250	M1	96.8	3840		96.0	10.1
Ethylbenzene	19.2	U	108	17.5	U	98.9	0.0	7690		242	5530		240	32.7
Toluene	143		108	162		98.9	12.5	525		242	462	B	240	12.8
Xylene (Total)	93.9	J	325	77.6	U	297	NC	10100		726	7170		720	33.9

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 1

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	25.1	J	58.9	563		114	182.9	8340		7600	12800		384	42.2
1,3,5-Trimethylbenzene	15.8	U	58.9	231		114	174.4	3130	J	7600	3930		384	22.7
Benzene	8.6	U	23.6	36.9	J	45.5	NC	6060		3040	5840		153	3.7
Ethylbenzene	34.4	J	58.9	42.4	J	114	20.8	29100		7600	37200		384	24.4
Toluene	18.3	U	58.9	176		114	NC	2360	U	7600	721		384	NC
Xylene (Total)	55.7	J	177	179	J	341	105.1	20600	J	22800	28000		1150	30.5

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 2

Parameter	Sample ID: 111313084			Sample ID: 111313095			RPD	Sample ID: 111513201			Sample ID: 111513208			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	1610		104	2040		104	23.6	374		128	215		63.7	54.0
1,3,5-Trimethylbenzene	511		104	669		104	26.8	153		128	80.4		63.7	62.2
Benzene	51.4		41.5	38.6	J	41.7	28.4	18.7	U	51.3	9.3	U	25.5	0.0
Ethylbenzene	51.5	J	104	45.5	J	104	12.4	23.1	J	128	15.8	J	63.7	37.5
Toluene	114		104	101	J	104	12.1	127	J	128	58.2	J	63.7	74.3
Xylene (Total)	551		312	539		313	2.2	170	J	385	92.3	J	191	59.2

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 3

Parameter	Sample ID: 111813251			Sample ID: 111813258			RPD	Sample ID: 112213444			Sample ID: 112213446			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	8610		1640	11400		1990	27.9	11.1	U	58.1	11.1	U	58.0	0.0
1,3,5-Trimethylbenzene	1740		1640	2680		1990	42.5	15.6	U	58.1	15.6	U	58.0	0.0
Benzene	440	J	657	539	J	797	20.2	34.4		23.3	17.2	J	23.2	66.7
Ethylbenzene	3080		1640	4310		1990	33.3	10.3	U	58.1	10.3	U	58.0	0.0
Toluene	510	U	1640	619	U	1990	0.0	18.1	U	58.1	18.0	U	58.0	0.0
Xylene (Total)	4580	J	4930	5840	J	5980	24.2	45.6	U	174	45.6	U	174	0.0

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 4

Parameter	Sample ID: 112613504			Sample ID: 112613517			RPD	Sample ID: 120213557			Sample ID: 120213570			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	14400		4010	15600		4030	8.0	18500		4130	19000		5230	2.7
1,3,5-Trimethylbenzene	4040		4010	4530		4030	11.4	5030		4130	5090	J	5230	1.2
Benzene	3550		1600	3830		1610	7.6	6050		1650	6320		2090	4.4
Ethylbenzene	34000		4010	34600		4030	1.7	50700		4130	50700		5230	0.0
Toluene	1240	U	4010	1250	U	4030	0.0	1280	U	4130	1620	U	5230	0.0
Xylene (Total)	24000		12000	25200		12100	4.9	31000		12400	31700		15700	2.2

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 5

Parameter	Sample ID: 111113038			Sample ID: 111113041			RPD	Sample ID: 111913305			Sample ID: 111913307			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	24.5	J	62.4	11.9	U	62.6	NC	50.8	J	77.2	44.5	J	71.9	13.2
1,3,5-Trimethylbenzene	52.1	J	62.4	34.9	J	62.6	39.5	20.7	U	77.2	19.3	U	71.9	0.0
Benzene	52.4		24.9	52.3		25.1	0.2	11.2	U	30.9	10.5	U	28.7	0.0
Ethylbenzene	11.0	U	62.4	11.1	U	62.6	0.0	16.0	J	77.2	14.0	J	71.9	13.3
Toluene	27.0	J	62.4	19.4	U	62.6	NC	24.0	U	77.2	22.3	U	71.9	0.0
Xylene (Total)	48.9	U	187	49.2	U	188	0.0	60.6	U	232	56.4	U	216	0.0

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 6

<i>Parameter</i>	<i>Sample ID: 112013358</i>			<i>Sample ID: 112013364</i>			<i>RPD</i>	<i>Sample ID: 120413619</i>			<i>Sample ID: 120413632</i>			<i>RPD</i>
	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>		<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	
1,2,4-Trimethylbenzene	12.1	U	63.5	2220		1410	197.8	24.2	U	127	33.8	J	127	NC
1,3,5-Trimethylbenzene	17.0	U	63.5	615	J	1410	NC	34.0	U	127	34.1	U	127	0.0
Benzene	26.7		25.4	682		565	184.9	18.5	U	50.7	18.5	U	50.8	0.0
Ethylbenzene	11.2	U	63.5	5440		1410	NC	22.5	U	127	22.5	U	127	0.0
Toluene	19.7	U	63.5	439	U	1410	0.0	46.9	J	127	49.4	J	127	5.2
Xylene (Total)	49.8	U	190	3800	J	4240	NC	99.6	U	381	99.8	U	381	0.0

3.2 SW-846 Method 8270C–Phenols

3.2.1 Summary

SW-846 Method 8270C employs gas chromatographic separation with mass spectroscopic identification for the phenolic compounds of interest.

One sample was extracted outside of the holding time. Sample 110813502 will be qualified with all positive results as estimated (“J”), and non-detect results as estimated (“UJ”). Phenol was requested on sample 120613843 but was not analyzed by the lab.

3.2.2 Method Blanks

The samples were prepared in multiple preparation batches. None of the method blanks associated with these sample analyses showed any contamination for any of the target compounds above the detection limit. Hence, no data are qualified due to method blank contamination.

Note that twenty-three field blanks were also submitted with these samples. None of the field blanks gave any positive results above the reporting limits. No data are qualified due to field blank contamination.

The results for the method blanks are summarized in Tables 3-10 and 3-11.

Table 3-10. Sediment Method 8270 Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 146010	QC Batch: 146197	QC Batch: 146307	QC Batch: 146454	QC Batch: 146598	QC Batch: 146916	QC Batch: 147199	QC Batch: 147542	QC Batch: 147702
2,4-Dimethylphenol	83.3 U								
2-Methylphenol(o-Cresol)	83.3 U								
3&4-Methylphenol(m&p Cresol)	17.4 U								
Phenol	19.8 U								

Table 3-10. Sediment Method 8270 Method Blank Results Summary (µg/Kg) Cont 1

Parameter	QC Batch: 148019	QC Batch: 148145	QC Batch: 148191	QC Batch: 148445	QC Batch: 148589	QC Batch: 148719	QC Batch: 148935	QC Batch: 149089	QC Batch: 149306
2,4-Dimethylphenol	83.3 U								
2-Methylphenol(o-Cresol)	83.3 U								
3&4-Methylphenol(m&p Cresol)	17.4 U								
Phenol	19.8 U								

Table 3-10. Sediment Method 8270 Method Blank Results Summary (µg/Kg) Cont 2

Parameter	QC Batch: 149307	QC Batch: 149651	QC Batch: 149918	QC Batch: 150071	QC Batch: 150173	QC Batch: 150422	QC Batch: 150592
2,4-Dimethylphenol	83.3 U						
2-Methylphenol(o-Cresol)	83.3 U						
3&4-Methylphenol(m&p Cresol)	17.4 U						
Phenol	19.8 U						

Table 3-11. Water Method 8270 Method Blank Results Summary (µg/L)

Parameter	QC Batch: 200-63780	QC Batch: 200-64111	QC Batch: 200-64605	QC Batch: 200-64688	QC Batch: 200-65186	QC Batch: 200-65673	QC Batch: 200-66280
2,4-Dimethylphenol	0.75 U						
		0.75 U				0.75 U	
2-Methylphenol	0.51 U						
		0.51 U				0.51 U	
3 & 4 Methylphenol	1.2 U						
		1.2 U				1.2 U	
Phenol	10 U						
		10 U				10 U	

3.2.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. All reported DFTPP tunes passed the established criteria. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all target analyte results.

All of the initial calibration verification (ICV) and continuing calibration verification (CCV) checks for Method 8270C performed gave acceptable results (i.e., <25% D for most compounds, <40%D for poor performing compounds using the CLP National Functional Guidelines) for all of the target analytes. Consequently, no data are qualified based upon calibration verification results.

3.2.4 Surrogate Compound Recoveries

Three surrogate compounds were spiked into each of the samples.

Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. A few samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Using the guidance from the October 1999 National Functional Guidelines (since the current NFG do not effectively address surrogate compounds), only sample results where at least two surrogate compounds from each fraction (i.e., base/neutral fraction or acid fraction) fail to recover within limits are cause for qualification. Under those conditions only one sample requires qualification of data, sample 102813265. Positive results for analytes in this sample will be qualified as estimated ("J"). Results for analytes reported as not detected are qualified as not detected with greater uncertainty as to the reporting limit ("UJ"). For samples 111913280 and 120613859, positive results for analytes will be qualified as estimated ("J") any analytes reported as not detect will be qualified as unusable ("R") since surrogate recoveries are less than ten percent.

The surrogate recoveries for all samples are presented in Tables 3-12 and 3-13.

Table 3-12. Sediment Method 8270 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
			Limits:	18	130	28	130	30
4087646001	102813264	10	61		77		74	
4087646002	102813265	4	39		27	2q	28	2q
4087646003	102813266	4	66		48		57	
4087646004	102813273	4	67		60		65	
4087646005	102813277	1	33		39		57	
4087646006	102813281	4	78		56		72	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4087646007	102813282	5	57		63		71	
4087646008	102813283	10	49		58		62	
4087646009	102813284	5	60		57		64	
4087646010	102813287	1	43		61		62	
4087646011	102813288	1	50		63		71	
4087646012	102913291	4	41		49		51	
4087646013	102913292	5	63		63		66	
4087646014	102913293	10	51		63		69	
4087646015	102913299	40	0	S4	0	S4	0	S4
4087646016	102913300	10	47		59		65	
4087646017	102913301	4	53		57		75	
4087646018	102913306	1	42		51		62	
4087646019	102913308	4	69		58		59	
4087646020	102913309	2	77		65		67	
4087646021	102913310	10	44		54		55	
4087646022	102913313	2	74		56		60	
4087646023	102913317	10	54		49		51	
4087646024	102913325	1	43		55		59	
4087646025	102913327	10	67		62		60	
4087646026	102913328	10	23		17	4q, S0	16	4q, S0
4087646027	102913329	5	41		32		32	
4087646028	102913338	10	44		47		45	
4087646029	102913343	1	33		54		74	
4087646030	102913348	1	42		54		60	
4087646031	102913349	10	58		49		55	
4087646032	102913350	5	60		50		58	
4087646033	102913351	5	62		49		58	
4087646034	102913355	10	31		30		35	
4087646035	102913361	5	38		49		64	
4088053001	110113375	5	72		53		61	
4088053002	110113376	5	69		61		63	
4088053003	110113377	5	64		51		58	
4088053004	110113380	4	74		54		66	
4088053005	110113386	10	45		46		48	
4088053006	110113389	10	41		41		44	
4088053007	110113390	1	25		48		55	
4088053008	110113392	5	56		44		56	
4088053009	110113393	10	53		50		62	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
			0	S4	0	S4	0	S4
4088053010	110113394	40	0	S4	0	S4	0	S4
4088053011	110113395	5	65		44		47	
4088053012	110113399	5	60		48		52	
4088053013	110113406	10	38		31		40	
4088053014	110113408	1	43		56		63	
4088053015	110113410	10	51		40		49	
4088053016	110113411	10	45		35		42	
4088053017	110113412	10	54		38		50	
4088053018	110113424	5	52		37		50	
4088053019	110113429	1	24		42		52	
4088053020	110413432	1	86		64		74	
4088053021	110413433	10	48		34		39	
4088053022	110413434	4	66		48		59	
4088053023	110413441	20	45		44		51	
4088053024	110413443	1	34		51		62	
4088053025	110413448	5	63		55		54	
4088053026	110413449	5	51		47		50	
4088053027	110413450	5	61		60		60	
4088053028	110413457	50	33		46		45	
4088053029	110413458	2	37		53		58	
4088053030	110413460	10	34		40		40	
4088053031	110413461	4	67		65		73	
4088053032	110413462	100	0	S4	0	S4	0	S4
4088053033	110413463	5	48		51		55	
4088053034	110413466	10	35		40		39	
4088053035	110413470	50	0	S4	0	S4	0	S4
4088053036	110413471	1	38		56		60	
4088482001	110813001	2	46		43		46	
4088482002	110813002	2	65		63		65	
4088482003	110813003	4	50		53		57	
4088482004	110813017	5	57		56		62	
4088482005	110813019	5	48		45		49	
4088482006	110813020	1	49		44		51	
4088482008	111113024	1	54		46		51	
4088482009	111113025	4	69		56		60	
4088482010	111113026	10	41		57		51	
4088482011	111113030	5	53		39		47	
4088482012	111113034	5	57		42		47	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol- <i>d</i> ₆	
4088482013	111113038	1	63		64		64	
4088482014	111113041	1	71		68		66	
4088482015	111213043	1	36		31		30	
4088482016	111213044	4	55		66		62	
4088482017	111213045	1	66		71		69	
4088482018	111213062	10	45		43		45	
4088482019	111213063	1	46		53		59	
4088482020	111213064	1	57		55		57	
4088486001	110813504	10	52		41		53	
4088486002	110813505	5	67		53		58	
4088486003	110813506	10	63		39		57	
4088486004	110813510	10	37		44		46	
4088486005	110813515	20	27		47		47	
4088486006	110813517	1	27		46		53	
4088486007	110813518	1	22		43		45	
4088622001	111313070	1	62		64		66	
4088622002	111313071	1	59		62		66	
4088622003	111313072	1	69		58		62	
4088622004	111313084	5	53		46		58	
4088622005	111313085	100	0	S4	0	S4	0	S4
4088622006	111313087	8	63		64		69	
4088622007	111313092	1	36		55		64	
4088622008	111313095	5	63		65		63	
4088622009	111313096	1	54		56		58	
4088622010	111313097	2	54		50		53	
4088622011	111313098	2	52		44		48	
4088622012	111313110	4	46		54		53	
4088622013	111313114	1	61		67		67	
4088622014	111413118	2	35		39		37	
4088622015	111413119	2	54		52		54	
4088622016	111413120	2	35		37		37	
4088622017	111413134	20	33		40		45	
4088622018	111413137	1	62		65		70	
4088622019	111413139	1	55		53		55	
4088622020	111413140	1	51		44		48	
4088622021	111413141	1	57		56		60	
4088622022	111413153	1	58		56		58	
4088622023	111413154	25	57		58		60	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4088622024	111413155	1	34		53		58	
4088879001	111513159	20	0	S4	0	S4	0	S4
4088879002	111513160	20	0	S4	0	S4	0	S4
4088879003	111513161	10	24		43		41	
4088879004	111513178	20	29		50		52	
4088879005	111513179	1	48		67		72	
4088879006	111513182	20	35		50		49	
4088879007	111513183	10	34		54		52	
4088879008	111513184	5	51		60		65	
4088879009	111513187	20	50		50		57	
4088879010	111513192	50	55		57		58	
4088879011	111513193	2	72		62		72	
4088879012	111513194	1	60		83		86	
4088879013	111513199	1	81		70		74	
4088879014	111513200	1	54		56		61	
4088879015	111513201	1	64		68		70	
4088879016	111813210	1	64		59		65	
4088879017	111813211	1	51		61		65	
4088879018	111813212	1	59		65		67	
4088879019	111813220	20	59		61		65	
4088879020	111813221	1	61		80		83	
4088879021	111813223	5	49		49		42	
4088879022	111813224	1	58		62		63	
4088879023	111813225	25	35		44		48	
4088879024	111813235	20	34		46		47	
4088879025	111813236	4	72		72		77	
4088879026	111813237	1	55		82		81	
4088879027	111813239	1	76		61		61	
4088879028	111813240	1	76		57		62	
4088879029	111813241	1	76		62		65	
4088879030	111813251	4	86		71		82	
4088879031	111813252	10	72		81		87	
4088879032	111813258	4	80		68		74	
4088879033	111913260	1	88		59		67	
4088879034	111913261	1	80		54		67	
4088879035	111913262	1	86		70		83	
4088879036	111913274	4	65		63		66	
4088879037	111913276	20	57		88		93	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4088879038	111913279	1	76		66		77	
4088879039	111913280	1	0	9q, S0	0	9q, S0	0	9q, S0
4088879040	111913281	1	62		62		68	
4088879041	111913292	5	57		52		70	
4088879042	111913293	1	65		66		73	
4088879043	111913298	5	71		58		83	
4088879044	111913299	2	78		71		84	
4088879045	111913300	1	65		60		75	
4088879046	111913305	1	49		54		60	
4088879047	111913307	1	58		61		70	
4088879048	111513208	1	54		50		55	
4089023001	112013310	1	81		63		74	
4089023002	112013311	20	59		35		47	
4089023003	112013312	1	74		55		64	
4089023004	112013318	5	55		50		58	
4089023005	112013327	5	64		49		62	
4089023006	112013328	1	64		68		83	
4089023007	112013331	1	78		63		73	
4089023008	112013332	4	45		27	S0	32	
4089023009	112013333	1	73		58		74	
4089023010	112013340	5	54		50		60	
4089023011	112013343	20	41		61		65	
4089023012	112013344	1	64		62		78	
4089023013	112013346	1	49		45		55	
4089023014	112013347	5	36		42		41	
4089023015	112013348	1	64		66		84	
4089023016	112013358	1	100		64		72	
4089023017	112013364	1	55		66		77	
4089023018	112113366	1	97		65		67	
4089023019	112113367	5	78		47		56	
4089023020	112113368	5	51		34		40	
4089023021	112113371	1	96		60		68	
4089023022	112113382	20	55		43		46	
4089023023	112113383	1	54		46		55	
4089023024	112113385	1	50		57		61	
4089023025	112113386	1	68		41		53	
4089023026	112113387	1	66		48		50	
4089023027	112113389	1	81		50		56	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol- <i>d</i> ₆	
4089023028	112113399	5	47		36		38	
4089023029	112113400	1	59		42		53	
4089202001	112213406	1	81		62		66	
4089202002	112213407	1	71		44		53	
4089202003	112213408	10	65		44		60	
4089202004	112213422	20	39		40		44	
4089202005	112213423	1	34		62		67	
4089202006	112213424	1	45		50		63	
4089202007	112213425	4	84		51		60	
4089202008	112213426	2	76		43		53	
4089202009	112213427	1	87		56		61	
4089202010	112213443	5	58		39		49	
4089202011	112213444	1	50		47		55	
4089202012	112213446	1	44		49		60	
4089202013	112213447	1	67		61		67	
4089202014	112213448	1	50		45		46	
4089202015	112213449	1	57		48		53	
4089202016	112213450	1	55		56		56	
4089202017	112513452	1	82		56		64	
4089202018	112513453	1	79		55		59	
4089202019	112513454	1	62		57		61	
4089202020	112513466	50	0	S4	0	S4	0	S4
4089202021	112513467	20	37		43		43	
4089202022	112513468	1	58		57		60	
4089202023	112513469	1	63		66		69	
4089202024	112513473	2	80		51		53	
4089202025	112513474	5	69		45		47	
4089202026	112513475	5	77		50		56	
4089202027	112513485	5	45		26	S0	32	
4089202028	112513486	1	120		106		117	
4089362001	112613490	1	59		50		50	
4089362002	112613491	1	65		51		54	
4089362003	112613492	1	66		53		53	
4089362004	112613503	5	60		53		55	
4089362005	112613504	10	53		53		57	
4089362006	112613505	10	47		53		56	
4089362007	112613506	1	51		44		52	
4089362008	112613517	20	43		43		43	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4089509001	120213522	1	89		48		60	
4089509002	120213523	1	76		49		64	
4089509003	120213524	1	69		51		60	
4089509004	120213532	20	76		40		51	
4089509005	120213535	1	56		48		62	
4089509006	120213545	1	18		26	SO	36	
4089509007	120213546	5	40		55		55	
4089509008	120213547	1	65		49		48	
4089509009	120213557	10	63		50		53	
4089509010	120213558	10	69		65		73	
4089509011	120213559	10	63		51		58	
4089509012	120213560	1	67		57		68	
4089509013	120213570	10	57		51		54	
4089509014	120313572	1	58		45		46	
4089509015	120313573	1	59		53		53	
4089509016	120313574	1	66		49		50	
4089509017	120313581	10	49		45		49	
4089509018	120313582	1	74		52		62	
4089509019	120313588	10	81		68		69	
4089509020	120313589	4	50		41		40	
4089509021	120313590	1	84		53		59	
4089509022	120313602	40	43		47		50	
4089509023	120313603	10	7	5q, SO	17	5q, SO	26	5q, SO
4089509024	120313604	1	23		49		52	
4089665001	120413617	1	90		62		73	
4089665002	120413618	1	61		42		45	
4089665003	120413619	1	74		58		63	
4089665004	120413629	25	46		41		43	
4089665005	120413630	1	43		62		68	
4089665006	120413632	2	74		55		61	
4089665007	120413633	2	75		48		57	
4089665008	120413634	4	38		43		47	
4089665009	120413635	20	50		42		46	
4089665010	120413641	5	56		53		60	
4089665011	120413642	1	61		51		55	
4089665012	120413645	20	46		52		49	
4089665013	120413646	12.5	68		55		54	
4089665014	120413653	40	65		54		60	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4089665015	120413654	1	53		55		60	
4089818001	120613845	2	68		57		64	
4089818002	120613846	2	71		57		65	
4089818003	120613847	2	45		43		49	
4089818004	120613851	2	45		46		52	
4089818005	120613859	4	4	2q, 50	4	2q, 50	4	2q, 50
4089818006	120613860	1	36		53		60	

Table 3-13. Water Method 8270 Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₅	
			Limits:	20	155	15	190	10
200-19227-36	102813262	1	43		49		30	
200-19227-38	102913290	1	34		47		29	
200-19267-1	103013363	1	57		43		28	
200-19364-1	110113373	1	68		48		30	
200-19364-3	110413431	1	66		49		30	
200-19364-4	110513474	1	66		47		29	
200-19434-1	110713490	1	68		53		35	
200-19557-1	110813502	1	56		42		27	
200-19557-3	111113023	1	59		44		29	
200-19557-4	111213042	1	67		46		29	
200-19664-1	111513157	1	66		43		28	
200-19664-3	111813209	1	77		51		33	
200-19664-4	111913259	1	76		47		30	
200-19709-1	112013308	1	56		41		28	
200-19709-3	112113365	1	58		39		26	
200-19777-1	112213404	1	46		33		23	
200-19777-3	112513451	1	57		35		23	
200-19822-9	120213518	1	63		45		31	
200-19876-1	120213520	1	61		41		27	
200-19876-3	120313571	1	65		48		32	
200-19939-1	120413615	1	72		47		32	
200-19939-3	120513657	1	74		51		35	

3.2.5 Internal Standard Areas

No sample analyses reported in this data set have internal standard areas less than 50% or greater than 200% of the area response of the corresponding continuing calibration verification. No data from Method 8270 will be qualified based upon internal standard responses.

3.2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on multiple samples.

None of the target analytes for the MS/MSD analyses samples recovered outside the limits used by the laboratory. The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The matrix spike/matrix spike duplicate results are summarized in Table 3-14.

Table 3-14. Sediment Method 8270 MS/MSD Recoveries

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
102813277	2,4-Dimethylphenol	1950	2240	115	2320	119	4	97.5 U	29
	2-Methylphenol(o-Cresol)	1950	1730	89	1790	92	3	97.5 U	29
	3&4-Methylphenol(m&p Cresol)	1950	1710	88	1780	91	4	20.3 U	29
	Phenol	1950	1380	71	1560	80	12	23.2 U	30
102813288	2,4-Dimethylphenol	2030	2210	109	2190	108	1	101 U	29
	2-Methylphenol(o-Cresol)	2030	1700	84	1890	93	10	101 U	29
	3&4-Methylphenol(m&p Cresol)	2030	1690	83	1760	87	4	21.1 U	29
	Phenol	2030	1580	78	1650	81	4	24.1 U	30
102913343	2,4-Dimethylphenol	2020	2390	118	2200	109	8	101 U	29
	2-Methylphenol(o-Cresol)	2020	1870	93	1680	83	11	101 UCH	29
	3&4-Methylphenol(m&p Cresol)	2020	1860	92	1670	83	11	21.0 UCH	29
	Phenol	2020	1710	85	1560	78	9	24.0 U	30
110113376	2,4-Dimethylphenol	3930	4020	103	3290	84	20	980 U	29
	2-Methylphenol(o-Cresol)	3930	2380	61	2500	64	5	980 U	29
	3&4-Methylphenol(m&p Cresol)	3930	3540	63	3830	70	8	1080 J	29
	Phenol	3930	2310	55	2260	54	2	233 UD3	30

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
110413443	2,4-Dimethylphenol	1900	2250	119	2250	119	0	94.7 U	29
	2-Methylphenol(o-Cresol)	1900	1620	86	1690	89	4	94.7 U	29
	3&4-Methylphenol(m&p Cresol)	1900	1520	80	1550	82	2	19.8 U	29
	Phenol	1900	1420	75	1450	77	2	22.5 U	30
110413458	2,4-Dimethylphenol	1900	2050	106	1820	94	12	190 U	29
	2-Methylphenol(o-Cresol)	1900	1470	77	1500	79	2	190 U	29
	3&4-Methylphenol(m&p Cresol)	1900	1540	75	1570	77	2	112 J	29
	Phenol	1900	1540	81	1460	77	5	45.1 UD3	30
111113038	2,4-Dimethylphenol	2080	2460	118	2400	116	3	104 U	29
	2-Methylphenol(o-Cresol)	2080	1590	77	1690	81	6	104 U	29
	3&4-Methylphenol(m&p Cresol)	2080	1520	73	1620	78	7	21.7 U	29
	Phenol	2080	1510	73	1530	74	1	24.7 U	30
111313092	2,4-Dimethylphenol	1950	2110	108	2290	117	8	97.3 U	29
	2-Methylphenol(o-Cresol)	1950	1610	82	1660	85	3	97.3 U	29
	3&4-Methylphenol(m&p Cresol)	1950	1570	81	1680	86	7	20.3 U	29
	Phenol	1950	1440	74	1600	82	10	23.1 U	30
111413155	2,4-Dimethylphenol	1960	1770	91	1880	96	6	97.6 U	29
	2-Methylphenol(o-Cresol)	1960	1180	60	1280	65	8	97.6 U	29
	3&4-Methylphenol(m&p Cresol)	1960	1120	57	1200	62	7	20.3 U	29
	Phenol	1960	1170	60	1200	62	2	23.2 U	30
111513200	2,4-Dimethylphenol	4620	5560	120	5180	112	7	231 U	29
	2-Methylphenol(o-Cresol)	4620	3640	79	3520	76	3	231 U	29
	3&4-Methylphenol(m&p Cresol)	4620	3880	76	3960	78	2	377 J	29
	Phenol	4620	3580	77	3320	72	7	54.9 U	30
111813252	2,4-Dimethylphenol	2090	2480	119	2790	134	12	1040 U	29
	2-Methylphenol(o-Cresol)	2090	1900 J	91	1810	87	5	1040 U	29
	3&4-Methylphenol(m&p Cresol)	2090	1830 J	88	1980	95	7	218 U	29
	Phenol	2090	1810 J	87	1800	86	5	248 UD3	29
112013358	2,4-Dimethylphenol	4230	4490	106	4480	106	0	212 U	29
	2-Methylphenol(o-Cresol)	4230	3860	91	3910	92	1	212 U	29
	3&4-Methylphenol(m&p Cresol)	4230	3730	88	3790	89	2	44.1 U	29
	Phenol	4230	3750	88	3630	86	3	50.3 U	29
111913305	2,4-Dimethylphenol	2580	2540	99	2670	104	5	129 U	29
	2-Methylphenol(o-Cresol)	2580	1670	65	1830	71	9	129 U	29
	3&4-Methylphenol(m&p Cresol)	2580	1610	62	1740	68	8	26.8 U	29
	Phenol	2580	1600	62	1890	73	17	30.6 U	30

Sample ID	Parameter	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	MSD Result (µg/Kg)	Rec (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
112213427	2,4-Dimethylphenol	4510	2930	65	2310	51	24	450 U	29
	2-Methylphenol(o-Cresol)	4510	2190	49	1780	39	21	450 U	29
	3&4-Methylphenol(m&p Cresol)	4510	2170	46	1700	35	24	107 J	29
	Phenol	4510	2010	42	1550	32	25	113 JM1	30
112613492	2,4-Dimethylphenol	4150	4360	105	4110	99	6	207 U	29
	2-Methylphenol(o-Cresol)	4150	3490	84	3370	81	3	207 U	29
	3&4-Methylphenol(m&p Cresol)	4150	3470	81	3560	84	3	101 J	29
	Phenol	4150	2940	71	2660	64	10	49.2 U	30
120213560	2,4-Dimethylphenol	2100	2010	96	1920	92	4	105 U	29
	2-Methylphenol(o-Cresol)	2100	1780	85	1550	74	14	105 U	29
	3&4-Methylphenol(m&p Cresol)	2100	1720	82	1520	73	12	21.9 U	29
	Phenol	2100	1730	82	1440	68	19	25.0 U	30
120413619	2,4-Dimethylphenol	8450	7540	89	8000	95	6	423 U	29
	2-Methylphenol(o-Cresol)	8450	6670	79	7470	88	11	423 U	29
	3&4-Methylphenol(m&p Cresol)	8450	7010	80	7570	86	8	277 J	29
	Phenol	8450	5820	68	6800	80	15	101 U	29

3.2.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples.

Some of the target analytes for the laboratory control samples recovered below the limits used by the laboratory. Positive results for the failed analytes in the batches are qualified as estimated ("J"). Values reported as non-detects will be qualified as rejected ("R"). The laboratory control sample results are given in Tables 3-15 and 3-16.

Table 3-15. Sediment Method 8270 LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 146010			QC Batch: 146197			QC Batch: 146307		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1690	101	1670	1510	90	1670	1750	105
2-Methylphenol	65	130	1670	1520	91	1670	1210	72	1670	1290	77
3&4-Methylphenol	63	130	1670	1490	90	1670	1170	70	1670	1260	76
Phenol	62	130	1670	1650	99	1670	1410	85	1670	1400	84

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 146454			QC Batch: 146598			QC Batch: 146916		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1270	76	1670	1590	96	1670	1680	101
2-Methylphenol	65	130	1670	1030	62	1670	1340	81	1670	1470	88
3&4-Methylphenol	63	130	1670	1030	62	1670	1390	83	1670	1400	84
Phenol	62	130	1670	1040	63	1670	1310	78	1670	1410	85

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 147199			QC Batch: 147542			QC Batch: 147702		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1760	106	1670	1780	107	1670	1700	102
2-Methylphenol	65	130	1670	1300	78	1670	1320	79	1670	1450	87
3&4-Methylphenol	63	130	1670	1260	76	1670	1320	79	1670	1370	82
Phenol	62	130	1670	1340	80	1670	1290	78	1670	1430	86

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 3

Parameter	Rec Limits (%)		QC Batch: 148019			QC Batch: 148145			QC Batch: 148191		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1340	80	1670	1450	87	1670	1790	107
2-Methylphenol	65	130	1670	1430	86	1670	1170	70	1670	1410	85
3&4-Methylphenol	63	130	1670	1390	83	1670	1170	70	1670	1460	88
Phenol	62	130	1670	1470	88	1670	1170	70	1670	1510	90

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 4

Parameter	Rec Limits (%)		QC Batch: 148445			QC Batch: 148589			QC Batch: 148719		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1940	116	1670	1760	106	1670	1550	93
2-Methylphenol	65	130	1670	1480	89	1670	1360	82	1670	1240	74
3&4-Methylphenol	63	130	1670	1460	87	1670	1420	85	1670	1230	74
Phenol	62	130	1670	1530	92	1670	1250	75	1670	1160	70

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 5

Parameter	Rec Limits (%)		QC Batch: 148935			QC Batch: 149089			QC Batch: 149306		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1610	97	1670	1700	102	1670	1300	78
2-Methylphenol	65	130	1670	1150	69	1670	1300	78	1670	1430	86
3&4-Methylphenol	63	130	1670	1120	67	1670	1270	76	1670	1440	86
Phenol	62	130	1670	1190	71	1670	1290	77	1670	1390	84

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 6

Parameter	Rec Limits (%)		QC Batch: 149307			QC Batch: 149651			QC Batch: 149918		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1360	82	1670	1220	73	1670	1530	92
2-Methylphenol	65	130	1670	1360	81	1670	1150	69	1670	1360	82
3&4-Methylphenol	63	130	1670	1340	80	1670	1150	69	1670	1330	80
Phenol	62	130	1670	1400	84	1670	1040	62	1670	1330	80

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 7

Parameter	Rec Limits (%)		QC Batch: 150071			QC Batch: 150173			QC Batch: 150422		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1500	90	1670	1330	80	1670	1500	90
2-Methylphenol	65	130	1670	1380	83	1670	1270	76	1670	1330	80
3&4-Methylphenol	63	130	1670	1320	79	1670	1280	77	1670	1300	78
Phenol	62	130	1670	1280	77	1670	1300	78	1670	1290	77

Table 3-15. Sediment Method 8270 LCS Results Summary Cont 8

Parameter	Rec Limits (%)		QC Batch: 150592		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1450	87
2-Methylphenol	65	130	1670	1390	83
3&4-Methylphenol	63	130	1670	1380	83
Phenol	62	130	1670	1420	85

Table 3-16. Water Method 8270 LCS Summary

Parameter	Rec Limits (%)		QC Batch: 200-63780			QC Batch: 200-64111			QC Batch: 200-64605		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2,4-Dimethylphenol	45	125	50.0	14.7	29	50.0	33.8	68	50.0	43.6	87
	45	125				50.0	35.6	71			
2-Methylphenol	55	110	50.0	37.0	74	50.0	39.0	78	50.0	45.3	91
	55	110				50.0	39.3	79			
3 & 4 Methylphenol	50	100	50.0	30.9	62	50.0	36.3	73	50.0	42.1	84
	50	100				50.0	36.2	72			
Phenol	20	70	50.0	19.4	39	50.0	22.2	44	50.0	26.0	52
	20	70				50.0	22.1	44			

Table 3-16. Water Method 8270 LCS Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 200-64688			QC Batch: 200-65186			QC Batch: 200-65673		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2,4-Dimethylphenol	45	125	50.0	32.6	65	50.0	35.8	72	50.0	29.4	59
	45	125							50.0	25.5	51
2-Methylphenol	55	110	50.0	37.9	76	50.0	40.2	80	50.0	35.2	70
	55	110							50.0	36.6	73
3 & 4 Methylphenol	50	100	50.0	34.7	69	50.0	36.7	73	50.0	32.5	65
	50	100							50.0	33.7	67
Phenol	20	70	50.0	20.5	41	50.0	22.7	45	50.0	18.8	38
	20	70							50.0	19.4	39

Table 3-16. Water Method 8270 LCS Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 200-66280		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)
2,4-Dimethylphenol	45	125	50.0	31.4	63
	45	125			
2-Methylphenol	55	110	50.0	41.7	83
	55	110			
3 & 4 Methylphenol	50	100	50.0	36.6	73
	50	100			
Phenol	20	70	50.0	23.0	46
	20	70			

3.2.8 Field Duplicates

Field duplicates generally exhibited good agreement for most of analytes with all RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate “NDs”, however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. None of the results outside the 30% RPD are greater than 2x the LOQ therefore no data are qualified based on the field duplicate results.

The results of the field duplicate analyses are given in Table 3-17.

Table 3-17. Sediment Method 8270 Field Duplicate Results

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	723	U	1450	659	U	1320	0.0	101	U	202	100	U	200	0.0
2-Methylphenol	723	UL2	1450	659	U	1320	0.0	101	UCH	202	100	U	200	0.0
3&4-Methylphenol	535	JL2	1450	155	J	1320	110.1	21.0	UCH	202	20.9	U	200	0.0
Phenol	172	UCH, D3	1450	157	UD3	1320	0.0	24.0	U	202	23.8	U	200	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 1

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	98.2	U	197	948	U	1900	0.0	7910	U	15900	1600	U	3200	0.0
2-Methylphenol	98.2	U	197	948	U	1900	0.0	7910	U	15900	1600	U	3200	0.0
3&4-Methylphenol	20.5	U	197	650	J	1900	NC	1650	U	15900	333	U	3200	0.0
Phenol	23.4	U	197	226	UD3	1900	0.0	1880	UD3	15900	380	UD3	3200	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 2

Parameter	Sample ID: 111313084			Sample ID: 111313095			RPD	Sample ID: 111513201			Sample ID: 111513208			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	866	U	1730	869	U	1740	0.0	214	U	428	106	U	213	0.0
2-Methylphenol	866	U	1730	869	U	1740	0.0	214	U	428	106	U	213	0.0
3&4-Methylphenol	317	J	1730	642	J	1740	67.8	424	J	428	268		213	45.1
Phenol	206	UD3	1730	207	UD3	1740	0.0	50.8	U	428	61.0	J	213	NC

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 3

Parameter	Sample ID: 111813251			Sample ID: 111813258			RPD	Sample ID: 112213444			Sample ID: 112213446			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	548	U	1100	664	U	1330	0.0	96.9	U	194	96.7	U	194	0.0
2-Methylphenol	548	U	1100	664	U	1330	0.0	96.9	U	194	96.7	U	194	0.0
3&4-Methylphenol	219	J	1100	271	J	1330	21.2	20.2	U	194	20.2	U	194	0.0
Phenol	207	JD3	1100	158	UD3	1330	NC	23.0	U	194	23.0	U	194	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 4

Parameter	Sample ID: 112613504			Sample ID: 112613517			RPD	Sample ID: 120213557			Sample ID: 120213570			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	1670	U	3350	3360	U	6730	0.0	1720	U	3450	1740	U	3500	0.0
2-Methylphenol	1670	U	3350	3360	U	6730	0.0	1720	U	3450	1740	U	3500	0.0
3&4-Methylphenol	348	U	3350	701	U	6730	0.0	359	U	3450	378	J	3500	NC
Phenol	397	UD3	3350	799	UD3	6730	0.0	410	UD3	3450	415	UD3	3500	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 5

Parameter	Sample ID: 111113038			Sample ID: 111113041			RPD	Sample ID: 111913305			Sample ID: 111913307			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	104	U	208	104	U	209	0.0	129	U	258	120	U	240	0.0
2-Methylphenol	104	U	208	104	U	209	0.0	129	U	258	120	U	240	0.0
3&4-Methylphenol	21.7	U	208	21.8	U	209	0.0	26.8	U	258	25.0	U	240	0.0
Phenol	24.7	U	208	24.8	U	209	0.0	30.6	U	258	28.5	U	240	0.0

Table 3-17. Sediment Method 8270 Field Duplicate Results Cont 6

Parameter	Sample ID: 112013358			Sample ID: 112013364			RPD	Sample ID: 120413619			Sample ID: 120413632			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	212	U	424	106	U	212	0.0	423	U	847	847	U	1700	0.0
2-Methylphenol	212	U	424	106	U	212	0.0	423	U	847	847	U	1700	0.0
3&4-Methylphenol	44.1	U	424	22.1	U	212	0.0	277	J	847	255	J	1700	8.3
Phenol	50.3	U	424	25.2	U	212	0.0	101	U	847	201	UD3	1700	0.0

3.3 SW-846 Method 8270C/SIM –PAHs

3.3.1 Summary

SW-846 Method 8270C/SIM employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM).

Some of the samples were extracted outside of the prescribed holding time. Samples 110813002, 111213045, 111513160, 112013318, 112013348, 112213427, 112613492, 120313573, 110813502, and 091913716 will be qualified with all positive results as estimated (“J”), and non-detect results as estimated (“UJ”). Sample 110713490 and the associated method blank were not spiked with the surrogate standards during the initial extraction. The samples were subsequently re-extracted outside holding time. For this sample all positive results will be qualified as estimated (“J”), and non-detect results as estimated (“UJ”).

3.3.2 Method Blanks, Equipment Blanks, Field Blanks

The samples were prepared in twenty-eight different preparation batches for sediment samples and five different batches for water samples (equipment blanks). None of the sediment method blanks showed any level of contamination. The method blank associated with one batch of water samples, 200-66593, had multiple analyte failures. The associated sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a “U”. Results that are above the reporting limit, but less than five times the reporting limit, will be qualified as estimated (“J”) due to the low levels of the results. Results more than five times the reporting limit will not be qualified

The results for the method blanks are summarized in Tables 3-18 and 3-19.

Twenty-six equipment (rinsate) blanks were submitted for analysis. Most of the equipment blanks showed some level of contamination. The associated sediment sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a (“U”). Results that are above the reporting limit, but less than five times the reporting limit, will be qualified as estimated (“J”) due to the low levels of the results. Results more than five times the reporting limit will not be qualified.

Table 3-18. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 145897	QC Batch: 146022	QC Batch: 146159	QC Batch: 146602	QC Batch: 146759	QC Batch: 147045	QC Batch: 147046	QC Batch: 147198	QC Batch: 147679	QC Batch: 147844
2-Methylnaphthalene	8.3 U									
Acenaphthene	8.3 U									
Acenaphthylene	8.3 U									
Anthracene	8.3 U									
Benzo(a)anthracene	8.3 U									
Benzo(a)pyrene	3.0 U									
Benzo(b)fluoranthene	8.3 U									
Benzo(g,h,i)perylene	8.3 U									
Benzo(k)fluoranthene	2.9 U									
Chrysene	8.3 U									
Dibenz(a,h)anthracene	8.3 U									
Fluoranthene	8.3 U									
Fluorene	8.3 U									
Indeno(1,2,3-cd)pyrene	8.3 U									
Naphthalene	8.3 U									
Phenanthrene	8.3 U									
Pyrene	8.3 U									

**Table 3-18. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)
Cont 1**

Parameter	QC Batch: 148018	QC Batch: 148053	QC Batch: 148109	QC Batch: 148256	QC Batch: 148259	QC Batch: 148430	QC Batch: 148444	QC Batch: 148586	QC Batch: 148722
2-Methylnaphthalene	8.3 U								
Acenaphthene	8.3 U								
Acenaphthylene	8.3 U								
Anthracene	8.3 U								
Benzo(a)anthracene	8.3 U								
Benzo(a)pyrene	3.0 U								
Benzo(b)fluoranthene	8.3 U								
Benzo(g,h,i)perylene	8.3 U								
Benzo(k)fluoranthene	2.9 U								
Chrysene	8.3 U								
Dibenz(a,h)anthracene	8.3 U								
Fluoranthene	8.3 U								
Fluorene	8.3 U								
Indeno(1,2,3-cd)pyrene	8.3 U								
Naphthalene	8.3 U								
Phenanthrene	8.3 U								
Pyrene	8.3 U								

**Table 3-18. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)
Cont 2**

Parameter	QC Batch: 148723	QC Batch: 149197	QC Batch: 149348	QC Batch: 149754	QC Batch: 149755	QC Batch: 150041	QC Batch: 150176	QC Batch: 150317	QC Batch: 150398
2-Methylnaphthalene	8.3 U								
Acenaphthene	8.3 U								
Acenaphthylene	8.3 U								
Anthracene	8.3 U								
Benzo(a)anthracene	8.3 U								
Benzo(a)pyrene	3.0 U								
Benzo(b)fluoranthene	8.3 U								
Benzo(g,h,i)perylene	8.3 U								
Benzo(k)fluoranthene	2.9 U								
Chrysene	8.3 U								
Dibenz(a,h)anthracene	8.3 U								
Fluoranthene	8.3 U								
Fluorene	8.3 U								
Indeno(1,2,3-cd)pyrene	8.3 U								
Naphthalene	8.3 U								
Phenanthrene	8.3 U								
Pyrene	8.3 U								

Table 3-19. Water Method 8270-SIM Method Blank Results Summary (µg/L)

<i>Parameter</i>	<i>QC Batch: 200-64903</i>	<i>QC Batch: 200-65095</i>	<i>QC Batch: 200-65550</i>	<i>QC Batch: 200-65973</i>
2-Methylnaphthalene	0.0012 U	0.0012 U	0.0012 U	0.0012 U
Acenaphthene	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Acenaphthylene	0.0010 U	0.0010 U	0.0010 U	0.0010 U
Anthracene	0.00070 U	0.00070 U	0.00070 U	0.00070 U
Benzo[a]anthracene	0.0012 U	0.0012 U	0.0012 U	0.0012 U
Benzo[a]pyrene	0.00051 U	0.00051 U	0.00051 U	0.00051 U
Benzo[b]fluoranthene	0.0010 U ^	0.0010 U	0.0010 U	0.0010 U
Benzo[g,h,i]perylene	0.0020 U	0.0020 U	0.0020 U	0.0020 U
Benzo[k]fluoranthene	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Chrysene	0.00091 U	0.00091 U	0.00091 U	0.00091 U
Dibenz(a,h)anthracene	0.0038 U	0.0038 U	0.0038 U	0.0038 U
Fluoranthene	0.00057 U	0.00057 U	0.00057 U	0.00057 U
Fluorene	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Indeno[1,2,3-cd]pyrene	0.0031 U	0.0031 U	0.0031 U	0.0031 U
Naphthalene	0.0015 U	0.0015 U	0.0015 U	0.0015 U
Phenanthrene	0.00079 U	0.00079 U	0.00079 U	0.00079 U
Pyrene	0.0012 U	0.0012 U	0.0012 U	0.0012 U

Table 3-19. Water Method 8270-SIM Method Blank Results Summary (µg/L) Cont 1

<i>Parameter</i>	<i>QC Batch: 200-65764</i>	<i>QC Batch: 200-66593</i>
2-Methylnaphthalene	0.0012 U	0.0012 U
	0.0012 U	0.0238
Acenaphthene	0.0011 U	0.0011 U
	0.0011 U	0.0251
Acenaphthylene	0.0010 U	0.0010 U
	0.0010 U	0.0238
Anthracene	0.00070 U	0.00070 U
	0.00070 U	0.0253
Benzo[a]anthracene	0.0012 U	0.0012 U
	0.0012 U	0.0297
Benzo[a]pyrene	0.00051 U	0.00051 U
	0.00051 U	0.0276
Benzo[b]fluoranthene	0.0010 U	0.0010 U
	0.0010 U	0.0268
Benzo[g,h,i]perylene	0.0020 U	0.0020 U
	0.0020 U	0.0261
Benzo[k]fluoranthene	0.0011 U	0.0011 U
	0.0011 U	0.0255
Chrysene	0.00091 U	0.00091 U
	0.00091 U	0.0273
Dibenz(a,h)anthracene	0.0038 U	0.0038 U
	0.0038 U	0.0296
Fluoranthene	0.00057 U	0.00057 U
	0.00057 U	0.0263
Fluorene	0.0011 U	0.0011 U
	0.0011 U	0.0259
Indeno[1,2,3-cd]pyrene	0.0031 U	0.0031 U
	0.0031 U	0.0262
Naphthalene	0.0015 U	0.0015 U
	0.0015 U	0.0262
Phenanthrene	0.00079 U	0.00079 U
	0.00079 U	0.0249
Pyrene	0.0012 U	0.0012 U
	0.0012 U	0.0246

3.3.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 30% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. No data are qualified as a consequence of the continuing calibration data.

The peak shapes and chromatographic resolution for the isomers benzo(b)fluoranthene and benzo(k)fluoranthene evident in the sample chromatograms for the samples indicate that the two isomers are not adequately resolved to be quantitated separately as the laboratory attempted to do. The laboratory's report narratives noted this issue but stopped short of reporting the two isomers as a coeluting pair (as is done for *m/p*-xylene). Consequently all positive results for benzo(b)fluoranthene and benzo(k)fluoranthene in all samples for these two isomers are qualified as estimated ("J").

3.3.4 Internal Standard Areas

The analysis for a few samples yielded an internal standard area less than 50% of the area response of the corresponding continuing calibration verification. Samples 111213063, 111213064, 111313087, 111313095, 111313097, 111313114, 111413134, 111413137, 111413155, 112513453, 112613491, and 120213523 recovered low for all internal standards. Sample 111813241 recovered low for perylene-*d*₁₂. For samples where the internal standard response is less than 50% of the area response of the corresponding continuing calibration verification, the June 2008 CLP National Functional Guidelines directs the reviewer to qualify positive results associated with the low response as estimated ("J") while non-detected values are qualified as unusable ("R").

3.3.5 Surrogate Compound Recoveries

Surrogates were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., PAHs), the surrogates reported should be adequate to monitor recovery in the analyses.

Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. A few samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Sample 120313573 with no dilution had a recovery below the lower limit. Since the failed recovery is not attributable to dilution, positive results for this sample are qualified as estimated ("J") and non-detects as unusable ("R"). Results for sample 121113524 recovered above the upper limit and will be qualified as estimated ("J") for all positive results.

The surrogate recoveries for all samples are presented in Tables 3-20 and 3-21.

Table 3-20. Sediment Method 8270-SIM Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
			Limits:	40	130	40
4087646002	102813265	5	37	3q, S0	34	3q, S0
4087646003	102813266	20	42		47	
4087646004	102813273	20	52		50	
4087646005	102813277	1	68		66	
4087646006	102813281	8	51		53	
4087646008	102813283	8	48		48	
4087646009	102813284	5	60		61	
4087646010	102813287	1	70		68	
4087646011	102813288	1	66		62	
4087646013	102913292	8	77		81	
4087646014	102913293	10	73		78	
4087646015	102913299	200	0	S4	0	S4
4087646017	102913301	20	61		65	
4087646018	102913306	10	85		91	
4087646020	102913309	8	64		68	
4087646021	102913310	8	59		59	
4087646022	102913313	20	0	S4	0	S4
4087646024	102913325	1	65		63	

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
4087646026	102913328	8	71		72	
4087646027	102913329	20	56		60	
4087646028	102913338	20	51		51	
4087646029	102913343	1	74		71	
4087646030	102913348	1	65		63	
4087646032	102913350	20	54		59	
4087646033	102913351	80	55		59	
4087646034	102913355	40	0	S4	0	S4
4087646035	102913361	125	0	S4	0	S4
4088053002	110113376	40	58		67	
4088053003	110113377	2	56		59	
4088053004	110113380	5	67		69	
4088053006	110113389	80	0	S4	0	S4
4088053007	110113390	1	81		78	
4088053008	110113392	4	63		63	
4088053010	110113394	1	62		67	
4088053011	110113395	2	65		63	
4088053012	110113399	20	69		72	
4088053013	110113406	12.5	64		62	
4088053014	110113408	1	67		65	
4088053016	110113411	20	0	S4	0	S4
4088053017	110113412	20	50		55	
4088053018	110113424	5	74		75	
4088053019	110113429	1	70		68	
4088053021	110413433	2	74		76	
4088053022	110413434	4	68		72	
4088053023	110413441	400	0	S4	0	S4
4088053024	110413443	1	73		70	
4088053026	110413449	1	78		77	
4088053027	110413450	4	62		63	
4088053028	110413457	250	0	S4	0	S4
4088053029	110413458	1	62		61	
4088053030	110413460	400	0	S4	0	S4
4088053032	110413462	20	51		55	
4088053033	110413463	5	61		60	
4088053034	110413466	10	48		51	
4088053036	110413471	250	0	S4	0	S4
4088482002	110813002	20	0	S4	0	S4

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
4088482003	110813003	2	52		59	
4088482004	110813017	20	57		57	
4088482006	110813020	1	90		85	
4088482007	110813022	40	61		62	
4088482009	111113025	100	0	S4	0	S4
4088482010	111113026	8	47		52	
4088482011	111113030	8	50		50	
4088482012	111113034	2	41		41	
4088482013	111113038	1	91		86	
4088482014	111113041	1	84		76	
4088482016	111213044	1	56		45	
4088482017	111213045	1	54		43	
4088482018	111213062	4	54		51	
4088482019	111213063	1	72		72	
4088482020	111213064	1	84		83	
4088486002	110813505	20	54		59	
4088486003	110813506	1	69		67	
4088486004	110813510	10	59		61	
4088486006	110813517	200	0	S4	0	S4
4088486007	110813518	4	77		79	
4088622002	111313071	2	59		58	
4088622003	111313072	1	67		56	
4088622004	111313084	5	41		40	
4088622006	111313087	20	0	S4	0	S4
4088622007	111313092	1	87		80	
4088622008	111313095	1	68		68	
4088622010	111313097	1	75		76	
4088622011	111313098	2	60		49	
4088622012	111313110	4	52		43	
4088622013	111313114	1	80		76	
4088622015	111413119	8	46		46	
4088622016	111413120	1	48		43	
4088622017	111413134	20	0	S4	0	S4
4088622018	111413137	1	86		85	
4088622020	111413140	1	70		64	
4088622021	111413141	1	74		62	
4088622022	111413153	20	0	S4	0	S4
4088622024	111413155	1	86		88	

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
4088879002	111513160	2	65		77	
4088879003	111513161	1	67		53	
4088879004	111513178	8	121		92	
4088879005	111513179	1	81		65	
4088879007	111513183	10	47		52	
4088879008	111513184	20	52		49	
4088879010	111513192	200	0	S4	0	S4
4088879011	111513193	10	50		46	
4088879012	111513194	20	69		64	
4088879015	111513201	2	61		51	
4088879017	111813211	1	63		56	
4088879018	111813212	1	54		48	
4088879019	111813220	40	64		58	
4088879020	111813221	4	97		75	
4088879022	111813224	1	66		59	
4088879023	111813225	2	60		56	
4088879025	111813236	100	0	S4	0	S4
4088879026	111813237	1	55		44	
4088879028	111813240	1	58		52	
4088879029	111813241	1	63		53	
4088879030	111813251	40	52		49	
4088879031	111813252	5	67		54	
4088879032	111813258	40	62		58	
4088879034	111913261	4	59		54	
4088879035	111913262	1	51		44	
4088879036	111913274	80	0	S4	0	S4
4088879037	111913276	1	59		48	
4088879039	111913280	4	52		40	
4088879040	111913281	2	55		43	
4088879041	111913292	80	0	S4	0	S4
4088879042	111913293	1	66		55	
4088879044	111913299	10	86		62	
4088879045	111913300	5	72		56	
4088879046	111913305	1	88		70	
4088879047	111913307	1	72		59	
4088879048	111513208	1	58		53	
4089023002	112013311	1	54		48	
4089023003	112013312	1	58		50	

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
4089023004	112013318	2	53		53	
4089023006	112013328	5	91		75	
4089023008	112013332	2	73		78	
4089023009	112013333	1	67		57	
4089023010	112013340	2	59		62	
4089023011	112013343	500	0	S4	0	S4
4089023012	112013344	1	86		74	
4089023014	112013347	10	53		58	
4089023015	112013348	2	56		58	
4089023016	112013358	5	74		59	
4089023017	112013364	5	79		65	
4089023019	112113367	1	74		68	
4089023020	112113368	2	59		50	
4089023021	112113371	2	55		55	
4089023022	112113382	100	0	S4	0	S4
4089023023	112113383	1	90		78	
4089023025	112113386	1	73		67	
4089023026	112113387	1	56		49	
4089023027	112113389	1	59		53	
4089023028	112113399	20	79		48	
4089023029	112113400	4	95		83	
4089202002	112213407	1	43		48	
4089202003	112213408	80	0	S4	0	S4
4089202004	112213422	1	46		48	
4089202005	112213423	1	65		55	
4089202006	112213424	1	56		48	
4089202008	112213426	1	46		54	
4089202009	112213427	1	49		45	
4089202010	112213443	4	41		42	
4089202011	112213444	1	76		62	
4089202012	112213446	1	61		59	
4089202014	112213448	1	44		50	
4089202015	112213449	1	59		61	
4089202016	112213450	1	67		70	
4089202018	112513453	1	58		69	
4089202019	112513454	1	63		67	
4089202021	112513467	80	0	S4	0	S4
4089202022	112513468	1	66		64	

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
4089202023	112513469	1	65		65	
4089202025	112513474	2	48		51	
4089202026	112513475	8	44		47	
4089202027	112513485	20	49		47	
4089202028	112513486	1	65		63	
4089362002	112613491	1	67		81	
4089362003	112613492	1	66		67	
4089362005	112613504	8	53		58	
4089362006	112613505	160	0	S4	0	S4
4089362007	112613506	1	74		74	
4089362008	112613517	160	0	S4	0	S4
4089509002	120213523	1	43		51	
4089509003	120213524	1	48		50	
4089509004	120213532	20	0	S4	0	S4
4089509005	120213535	20	0		0	
4089509007	120213546	1	46		58	
4089509008	120213547	1	50		53	
4089509009	120213557	400	0	S4	0	S4
4089509010	120213558	160	0	S4	0	S4
4089509012	120213560	1	74		73	
4089509013	120213570	400	0	S4	0	S4
4089509015	120313573	1	39	2q, S0	33	2q, S0
4089509016	120313574	1	47		48	
4089509017	120313581	160	0	S4	0	S4
4089509018	120313582	1	82		82	
4089509020	120313589	2	44		57	
4089509021	120313590	1	51		55	
4089509022	120313602	400	0	S4	0	S4
4089509024	120313604	1	64		63	
4089665002	120413618	1	71		73	
4089665003	120413619	1	75		87	
4089665004	120413629	160	0	S4	0	S4
4089665005	120413630	1	84		84	
4089665006	120413632	1	70		79	
4089665008	120413634	8	70		85	
4089665009	120413635	20	60		74	
4089665010	120413641	8	74		79	
4089665011	120413642	1	78		77	

Lab Sample Number	Field ID	Dilution	2-Fluoro-biphenyl		Terphenyl- <i>d</i> ₁₄	
			0	S4	0	S4
4089665013	120413646	200	0	S4	0	S4
4089665014	120413653	100	0	S4	0	S4
4089665015	120413654	10	76		82	
4089818002	120613846	4	58		64	
4089818003	120613847	2	76		77	
4089818004	120613851	2	63		66	
4089818005	120613859	40	43		47	
4089818006	120613860	1	70		70	

Table 3-21. Water Method 8270-SIM Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	2-Methyl-naphthalene- <i>d</i> ₁₀		Benzo(a)pyrene- <i>d</i> ₁₂		Fluoranthene- <i>d</i> ₁₀		Fluorene- <i>d</i> ₁₀	
			Limits:	50	110	10	160	50	120	60
200-19227-36	102813262	1	85		102		88		89	
200-19227-38	102913290	1	84		90		85		82	
200-19267-1	103013363	1	81		67		77		71	
200-19364-1	110113373	1	92		69		88		81	
200-19364-3	110413431	10	94		81		93		88	
200-19364-4	110513474	1	90		80		88		81	
200-19434-1	110713490	1	74		73		74		70	
200-19557-1	110813502	1	78		80		82		76	
200-19557-3	111113023	1	83		80		84		80	
200-19557-4	111213042	1	84		84		87		81	
200-19664-1	111513157	1	82		86		83		78	
200-19664-3	111813209	1	82		83		79		76	
200-19664-4	111913259	1	90		90		90		82	
200-19709-1	112013308	1	63		58		68		62	
200-19709-3	112113365	1	77		65		75		74	
200-19777-1	112213404	1	72		65		70		70	
200-19777-3	112513451	1	70		65		68		67	
200-19822-9	120213518	1	82		74		76		74	
200-19876-1	120213520	1	84		86		91		86	
200-19876-3	120313571	1	86		94		90		94	

Lab Sample Number	Field ID	Dilution	2-Methyl-naphthalene- d_{10}		Benzo(a)pyrene- d_{12}		Fluoranthene- d_{10}		Fluorene- d_{10}	
200-19939-1	120413615	1	77		89		87		83	
200-19939-3	120513657	1	73		89		85		89	
200-20035-1	120613843	1	79		87		86		93	
200-20035-3	120913863	1	74		81		84		89	
200-20074-1	121013867	6.7	80		87		84		83	
200-20074-2	121113524	50	89		118		134	D	130	D

3.3.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on multiple samples.

In many cases some of the target analytes for the MS/MSD analyses samples recovered outside the limits used by the laboratory. The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data. The MS/MSD sample results are given in Table 3-22.

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 102813277

Parameter	MS Sample ID: 102813277			MSD Sample ID: 102813277			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	389	331	54	389	321	52	3	119	35
Acenaphthene	389	341	59	389	334	57	2	112	35
Acenaphthylene	389	299	73	389	307	76	3	12.4 J	25
Anthracene	389	365	68	389	356	66	3	98.3	38
Benzo(a)anthracene	389	337	69	389	322	66	4	66	30
Benzo(a)pyrene	389	441	93	389	413	86	6	78.8	33
Benzo(b)fluoranthene	389	467	110	389	441	103	6	39	44
Benzo(g,h,i)perylene	389	423	99	389	417	97	1	37.4	33
Benzo(k)fluoranthene	389	393	87	389	398	88	1	54.8	37
Chrysene	389	350	71	389	334	66	5	75.1	38
Dibenz(a,h)anthracene	389	395	99	389	405	101	2	9.9 J	27
Fluoranthene	389	368	58	389	339	50	8	143	50
Fluorene	389	334	72	389	333	72	0	54.4	32
Indeno(1,2,3-cd)pyrene	389	403	96	389	406	97	1	29	28
Naphthalene	389	451	26	389	385	9	16	350 M1	40
Phenanthrene	389	425	41	389	368	26	14	265 M1	46
Pyrene	389	392	51	389	341	37	14	194	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 102913343

<i>Parameter</i>	<i>MS Sample ID: 102913343</i>			<i>MSD Sample ID: 102913343</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	403	663	58	403	493	16	29	427 M1	35
Acenaphthene	403	343	61	403	354	64	3	96	35
Acenaphthylene	403	303	63	403	326	69	7	48.6	25
Anthracene	403	377	62	403	371	61	1	126	38
Benzo(a)anthracene	403	345	57	403	351	59	2	115	30
Benzo(a)pyrene	403	358	60	403	374	63	4	118	33
Benzo(b)fluoranthene	403	349	67	403	387	76	10	79.4	44
Benzo(g,h,i)perylene	403	271	56	403	301	63	11	46.6	33
Benzo(k)fluoranthene	403	314	59	403	350	68	11	76.3	37
Chrysene	403	367	58	403	364	57	1	135	38
Dibenz(a,h)anthracene	403	271	62	403	314	73	15	19.0 J	27
Fluoranthene	403	391	52	403	379	49	3	181 L2	50
Fluorene	403	368	66	403	361	64	2	101	32
Indeno(1,2,3-cd)pyrene	403	276	58	403	313	67	13	43	28
Naphthalene	403	1370	182	403	2980	581	74	634 M1, R1	40
Phenanthrene	403	638	57	403	478	18	29	407 M1	46
Pyrene	403	457	53	403	411	41	10	244	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 110113376

<i>Parameter</i>	<i>MS Sample ID: 110113376</i>			<i>MSD Sample ID: 110113376</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	783	784 U	-239	783	739	-242		2640 M6	35
Acenaphthene	783	784 U	-422	783	728	-424		4050 M6	35
Acenaphthylene	783	784 U	-374	783	715	-378		3680 M6	25
Anthracene	783	971 J	-1870	783	965	-1870		15600 M6	38
Benzo(a)anthracene	783	1690	-2490	783	1720	-2490	2	21200 M6	30
Benzo(a)pyrene	783	1790	-2220	783	1800	-2220	1	19200 M6	33
Benzo(b)fluoranthene	783	1870	-2010	783	1820	-2010	3	17600 M6	44
Benzo(g,h,i)perylene	783	1240 J	-909	783	1220	-912		8370 M6	33
Benzo(k)fluoranthene	783	1660	-1900	783	1720	-1890	4	16600 M6	37
Chrysene	783	2080	-2570	783	2170	-2560	4	22200 M6	38
Dibenz(a,h)anthracene	783	843 J	-362	783	840	-362		3680 M6	27
Fluoranthene	783	3170	-5450	783	3320	-5440	5	45900 M6	50
Fluorene	783	784 U	-1130	783	763	-1130		9660 M6	32
Indeno(1,2,3-cd)pyrene	783	1090 J	-1020	783	1070	-1020		9060 M6	28
Naphthalene	783	784 U	-184	783	740	-174		2100 M6	40
Phenanthrene	783	2220	-5440	783	2290	-5440	3	44900 M6	46
Pyrene	783	2860	-4100	783	3000	-4080	5	35000 M6	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 110413458

<i>Parameter</i>	<i>MS Sample ID: 110413458</i>			<i>MSD Sample ID: 110413458</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	379	344	61	379	350	62	2	114	35
Acenaphthene	379	362	68	379	370	70	2	104	35
Acenaphthylene	379	286	73	379	283	73	1	9.5 U	25
Anthracene	379	387	80	379	376	77	3	83.5	38
Benzo(a)anthracene	379	305	71	379	303	71	1	34.7	30
Benzo(a)pyrene	379	317	74	379	314	74	1	34.9	33
Benzo(b)fluoranthene	379	324	80	379	322	80	1	18.7 J	44
Benzo(g,h,i)perylene	379	296	74	379	292	73	1	17.1 J	33
Benzo(k)fluoranthene	379	303	75	379	295	73	2	19.9	37
Chrysene	379	316	73	379	317	73	0	38.9	38
Dibenz(a,h)anthracene	379	283	74	379	278	72	2	9.5 U	27
Fluoranthene	379	354	74	379	353	73	0	74.8	50
Fluorene	379	325	75	379	325	75	0	40.4	32
Indeno(1,2,3-cd)pyrene	379	287	73	379	283	71	2	11.7 J	28
Naphthalene	379	649	-11	379	661	-8	2	691 M1	40
Phenanthrene	379	438	69	379	441	70	1	175	46
Pyrene	379	385	74	379	388	74	1	106	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 111113038

<i>Parameter</i>	<i>MS Sample ID: 111113038</i>			<i>MSD Sample ID: 111113038</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	415	337	79	415	358	84	6	10.4 U	35
Acenaphthene	415	375	85	415	402	91	7	22.6	35
Acenaphthylene	415	356	85	415	385	92	8	10.4 U	25
Anthracene	415	407	89	415	427	94	5	34.5	38
Benzo(a)anthracene	415	362	68	415	407	79	12	77.4	30
Benzo(a)pyrene	415	427	83	415	470	93	10	81.7	33
Benzo(b)fluoranthene	415	410	77	415	478	93	15	90.4	44
Benzo(g,h,i)perylene	415	380	81	415	404	86	6	44.9	33
Benzo(k)fluoranthene	415	433	86	415	431	86	0	74.2	37
Chrysene	415	408	71	415	443	79	8	114	38
Dibenz(a,h)anthracene	415	357	82	415	374	86	5	15.5 J	27
Fluoranthene	415	499	59	415	475	54	5	252	50
Fluorene	415	368	84	415	379	86	3	20.1 J	32
Indeno(1,2,3-cd)pyrene	415	366	79	415	392	85	7	36.6	28
Naphthalene	415	333	78	415	348	82	4	10.4 U	40
Phenanthrene	415	466	66	415	413	53	12	193	46
Pyrene	415	469	66	415	489	71	4	196	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 111313092

<i>Parameter</i>	<i>MS Sample ID: 111313092</i>			<i>MSD Sample ID: 111313092</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	389	292	49	389	315	55	8	102	35
Acenaphthene	389	301	56	389	319	60	6	84.4	35
Acenaphthylene	389	287	68	389	304	72	6	23.8	25
Anthracene	389	329	46	389	351	52	7	149	38
Benzo(a)anthracene	389	290	30	389	315	37	8	172	30
Benzo(a)pyrene	389	306	36	389	330	42	8	164	33
Benzo(b)fluoranthene	389	322	50	389	340	55	5	128	44
Benzo(g,h,i)perylene	389	306	58	389	329	64	7	80.6	33
Benzo(k)fluoranthene	389	293	45	389	318	52	8	116	37
Chrysene	389	297	29	389	324	35	8	186 M1	38
Dibenz(a,h)anthracene	389	293	68	389	309	73	6	27.1	27
Fluoranthene	389	316	3	389	347	11	9	304 M1	50
Fluorene	389	298	58	389	320	64	7	71.6	32
Indeno(1,2,3-cd)pyrene	389	295	57	389	312	61	6	72.9	28
Naphthalene	389	289	37	389	307	42	6	145	40
Phenanthrene	389	349	-8	389	381	1	9	379 M1	46
Pyrene	389	318	-1	389	352	8	10	322 M1	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 111813252

<i>Parameter</i>	<i>MS Sample ID: 111813252</i>			<i>MSD Sample ID: 111813252</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	417	549	107	417	292	45	61	102 JR1	35
Acenaphthene	417	436	96	417	281	59	43	52.2 UR1	35
Acenaphthylene	417	284	68	417	236	56	19	52.2 U	25
Anthracene	417	377	87	417	270	61	33	52.2 U	38
Benzo(a)anthracene	417	308	74	417	250	60	21	52.2 U	30
Benzo(a)pyrene	417	323	77	417	267	64	19	18.6 U	33
Benzo(b)fluoranthene	417	318	76	417	244	58	26	52.2 U	44
Benzo(g,h,i)perylene	417	239	57	417	185	44	25	52.2 U	33
Benzo(k)fluoranthene	417	313	75	417	275	66	13	18.4 U	37
Chrysene	417	311	72	417	255	58	20	52.2 U	38
Dibenz(a,h)anthracene	417	284	68	417	229	55	22	52.2 U	27
Fluoranthene	417	361	83	417	258	58	34	52.2 U	50
Fluorene	417	381	88	417	263	60	37	52.2 UR1	32
Indeno(1,2,3-cd)pyrene	417	273	65	417	217	52	23	52.2 U	28
Naphthalene	417	1130	-88	417	435	-254	89	1500 M1, R1	40
Phenanthrene	417	599	131	417	310	62	64	52.2 UR1	46
Pyrene	417	390	88	417	264	58	39	52.2 U	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 111913305

<i>Parameter</i>	<i>MS Sample ID: 111913305</i>			<i>MSD Sample ID: 111913305</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	514	594	10	514	497	-9	18	542 M1	35
Acenaphthene	514	428	48	514	415	46	3	179	35
Acenaphthylene	514	350	65	514	362	68	3	14.6 J	25
Anthracene	514	437	64	514	433	63	1	109	38
Benzo(a)anthracene	514	374	65	514	374	65	0	39.5	30
Benzo(a)pyrene	514	473	86	514	478	86	1	33.2	33
Benzo(b)fluoranthene	514	480	88	514	486	89	1	26.1	44
Benzo(g,h,i)perylene	514	459	86	514	468	88	2	16.9 J	33
Benzo(k)fluoranthene	514	431	81	514	443	83	3	15.4 J	37
Chrysene	514	384	66	514	387	66	1	45	38
Dibenz(a,h)anthracene	514	456	88	514	470	90	3	12.9 U	27
Fluoranthene	514	434	66	514	416	62	4	97	50
Fluorene	514	408	60	514	407	60	0	100	32
Indeno(1,2,3-cd)pyrene	514	452	86	514	461	87	2	12.9 U	28
Naphthalene	514	589	19	514	455	-7	26	493 M1	40
Phenanthrene	514	566	45	514	512	34	10	336	46
Pyrene	514	455	65	514	430	60	6	120	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 112013358

<i>Parameter</i>	<i>MS Sample ID: 112013358</i>			<i>MSD Sample ID: 112013358</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	423	657	91	423	317	11	70	270 M1, R1	35
Acenaphthene	423	355	73	423	299	60	17	52.9 U	35
Acenaphthylene	423	276	64	423	273	63	1	52.9 U	25
Anthracene	423	306	70	423	302	69	1	52.9 U	38
Benzo(a)anthracene	423	290	66	423	281	64	3	52.9 U	30
Benzo(a)pyrene	423	322	74	423	316	72	2	18.8 U	33
Benzo(b)fluoranthene	423	302	71	423	307	73	1	52.9 U1q	44
Benzo(g,h,i)perylene	423	321	76	423	314	74	2	52.9 U	33
Benzo(k)fluoranthene	423	319	75	423	309	73	3	18.6 U1q	37
Chrysene	423	303	69	423	290	66	4	52.9 U	38
Dibenz(a,h)anthracene	423	322	76	423	316	75	2	52.9 U	27
Fluoranthene	423	293	66	423	288	65	2	52.9 U	50
Fluorene	423	296	68	423	286	65	4	52.9 U	32
Indeno(1,2,3-cd)pyrene	423	319	75	423	288	68	10	52.9 U	28
Naphthalene	423	3330	232	423	515	-433	146	2350 M1, R1	40
Phenanthrene	423	314	66	423	302	64	4	52.9 U	46
Pyrene	423	297	66	423	291	64	2	52.9 U	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 112213427

<i>Parameter</i>	<i>MS Sample ID: 112213427</i>			<i>MSD Sample ID: 112213427</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	1800	1150	53	1800	1060	48	8	198	35
Acenaphthene	1800	1080	55	1800	983	50	9	84.8 J	35
Acenaphthylene	1800	1030	55	1800	948	50	8	45.0 U	25
Anthracene	1800	1190	56	1800	1110	51	7	191	38
Benzo(a)anthracene	1800	1290	49	1800	1210	44	7	412	30
Benzo(a)pyrene	1800	1490	54	1800	1350	46	10	513	33
Benzo(b)fluoranthene	1800	1610	60	1800	1450	51	11	538	44
Benzo(g,h,i)perylene	1800	1540	60	1800	1440	55	6	450	33
Benzo(k)fluoranthene	1800	1390	45	1800	1310	41	5	577	37
Chrysene	1800	1480	45	1800	1370	39	7	678	38
Dibenz(a,h)anthracene	1800	1260	64	1800	1200	61	5	110	27
Fluoranthene	1800	1940	28	1800	1740	16	11	1440 M1	50
Fluorene	1800	1090	54	1800	983	48	10	121	32
Indeno(1,2,3-cd)pyrene	1800	1480	62	1800	1380	57	6	359	28
Naphthalene	1800	1080	51	1800	990	46	9	163 2q	40
Phenanthrene	1800	1500	36	1800	1360	28	10	843	46
Pyrene	1800	1840	32	1800	1670	23	9	1270 M1	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 120213560

<i>Parameter</i>	<i>MS Sample ID: 120213560</i>			<i>MSD Sample ID: 120213560</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	419	562	88	419	493	71	13	193	35
Acenaphthene	419	400	80	419	347	67	14	64.7	35
Acenaphthylene	419	351	80	419	281	63	22	16.6 J	25
Anthracene	419	405	85	419	326	66	22	50.2	38
Benzo(a)anthracene	419	346	76	419	273	59	23	27.7	30
Benzo(a)pyrene	419	371	82	419	308	67	19	28.1	33
Benzo(b)fluoranthene	419	359	81	419	292	65	21	21.0 J	44
Benzo(g,h,i)perylene	419	318	73	419	235	53	30	10.9 J	33
Benzo(k)fluoranthene	419	363	83	419	289	66	23	12.5 J	37
Chrysene	419	364	79	419	291	61	22	33.3	38
Dibenz(a,h)anthracene	419	341	80	419	266	62	25	10.5 U	27
Fluoranthene	419	387	81	419	305	61	24	47.5	50
Fluorene	419	380	82	419	318	67	18	36.2	32
Indeno(1,2,3-cd)pyrene	419	343	80	419	265	61	26	10.5 U	28
Naphthalene	419	813	89	419	780	81	4	440	40
Phenanthrene	419	446	75	419	384	60	15	130	46
Pyrene	419	399	78	419	316	58	23	71.8	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 112613492

<i>Parameter</i>	<i>MS Sample ID: 112613492</i>			<i>MSD Sample ID: 112613492</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	1660	1130	64	1660	69.1	0		73.1 JH2, M1	35
Acenaphthene	1660	1150	66	1660	67.3	0		63.9 JH2, M1	35
Acenaphthylene	1660	1120	65	1660	66.3	1		43.6 JH2, M1	25
Anthracene	1660	1480	81	1660	76.7	-4		141 H2, M1	38
Benzo(a)anthracene	1660	1620	78	1660	146	-10	167	319 H2, M1, R1	30
Benzo(a)pyrene	1660	1930	93	1660	177	-13	166	388 H2, M1, R1	33
Benzo(b)fluoranthene	1660	1950	96	1660	211	-9	161	360 H2, M1, R1	44
Benzo(g,h,i)perylene	1660	1590	80	1660	136	-8	168	267 H2, M1, R1	33
Benzo(k)fluoranthene	1660	1790	82	1660	167	-16	166	427 H2, M1, R1	37
Chrysene	1660	1820	82	1660	177	-18	165	468 H2, M1, R1	38
Dibenz(a,h)anthracene	1660	1510	87	1660	140	4	166	77.7 JH2, M1, R1	27
Fluoranthene	1660	2440	88	1660	229	-45	166	976 H2, M1, R1	50
Fluorene	1660	1220	69	1660	63.8	-1		72.6 JH2, M1	32
Indeno(1,2,3-cd)pyrene	1660	1490	76	1660	130	-6	168	228 H2, M1, R1	28
Naphthalene	1660	1070	59	1660	82.6	-1		92.4 2q, H2, M1	40
Phenanthrene	1660	1880	81	1660	130	-25	174	541 H2, M1, R1	46
Pyrene	1660	2340	87	1660	213	-42	167	903 H2, M1, R1	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 120413619

<i>Parameter</i>	<i>MS Sample ID: 120413619</i>			<i>MSD Sample ID: 120413619</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	1690	1320	72	1690	1220	66	8	106	35
Acenaphthene	1690	1320	70	1690	1310	69	1	144	35
Acenaphthylene	1690	1300	72	1690	1270	70	2	85.9	25
Anthracene	1690	1450	65	1690	1550	71	6	353	38
Benzo(a)anthracene	1690	1640	43	1690	1760	50	7	918	30
Benzo(a)pyrene	1690	1870	45	1690	1990	52	6	1110	33
Benzo(b)fluoranthene	1690	2020	57	1690	1990	56	1	1050	44
Benzo(g,h,i)perylene	1690	1610	51	1690	1580	49	2	743	33
Benzo(k)fluoranthene	1690	1680	37	1690	1930	53	14	1040	37
Chrysene	1690	1800	34	1690	2010	46	11	1230 M1	38
Dibenz(a,h)anthracene	1690	1520	76	1690	1510	76	0	227	27
Fluoranthene	1690	2280	-3	1690	2530	12	11	2340 M1	50
Fluorene	1690	1390	72	1690	1390	72	0	175	32
Indeno(1,2,3-cd)pyrene	1690	1660	61	1690	1530	54	8	627	28
Naphthalene	1690	1060	57	1690	1080	58	2	101	40
Phenanthrene	1690	1880	24	1690	2010	32	7	1470 M1	46
Pyrene	1690	2210	1	1690	2490	18	12	2190 M1	49

Table 3-22. Sediment Method 8270 SIM MS/MSD Recoveries Sample 120613860

<i>Parameter</i>	<i>MS Sample ID: 120613860</i>			<i>MSD Sample ID: 120613860</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	406	291	65	406	288	64	1	27.2	35
Acenaphthene	406	279	65	406	275	64	1	15.8 J	35
Acenaphthylene	406	270	66	406	268	66	1	10.2 U	25
Anthracene	406	291	66	406	290	65	0	24.2	38
Benzo(a)anthracene	406	261	62	406	259	61	1	10.9 J	30
Benzo(a)pyrene	406	271	65	406	300	72	10	6.7 J	33
Benzo(b)fluoranthene	406	270	65	406	279	67	3	10.2 U	44
Benzo(g,h,i)perylene	406	307	75	406	306	74	0	10.2 U	33
Benzo(k)fluoranthene	406	292	71	406	284	69	3	3.6 U	37
Chrysene	406	276	65	406	275	65	0	12.4 J	38
Dibenz(a,h)anthracene	406	299	74	406	298	73	0	10.2 U	27
Fluoranthene	406	275	60	406	275	60	0	31.5	50
Fluorene	406	277	64	406	274	63	1	17.4 J	32
Indeno(1,2,3-cd)pyrene	406	286	70	406	287	70	0	10.2 U	28
Naphthalene	406	272	57	406	267	56	2	41.0	40
Phenanthrene	406	283	49	406	283	49	0	83.6	46
Pyrene	406	272	60	406	275	61	1	26.5	49

3.3.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. None of the analytes recovered outside of the acceptance limits established by the laboratory. No data are qualified due to failed LCS recoveries. The laboratory control sample results are given in Tables 3-23 and 24.

Table 3-23. Sediment Method 8270-SIM LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 145897			QC Batch: 146022			QC Batch: 146159		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	228	68	333	196	59	333	190	57
Acenaphthene	55	130	333	242	73	333	220	66	333	204	61
Acenaphthylene	55	130	333	223	67	333	203	61	333	198	59
Anthracene	66	130	333	258	77	333	243	73	333	220	66
Benzo(a)anthracene	55	130	333	220	66	333	206	62	333	196	59
Benzo(a)pyrene	56	130	333	268	81	333	266	80	333	248	75
Benzo(b)fluoranthene	53	130	333	288	87	333	265	80	333	252	76
Benzo(g,h,i)perylene	51	130	333	232	69	333	268	81	333	259	78
Benzo(k)fluoranthene	52	130	333	258	77	333	279	84	333	261	78
Chrysene	58	130	333	234	70	333	226	68	333	207	62
Dibenz(a,h)anthracene	55	130	333	235	70	333	300	90	333	256	77
Fluoranthene	62	130	333	222	67	333	213	64	333	205	61
Fluorene	58	130	333	241	72	333	223	67	333	203	61
Indeno(1,2,3-cd)pyrene	54	130	333	240	72	333	286	86	333	255	77
Naphthalene	41	130	333	204	61	333	178	53	333	182	55
Phenanthrene	60	130	333	238	71	333	224	67	333	200	60
Pyrene	51	130	333	240	72	333	215	65	333	202	61

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 146602			QC Batch: 146759			QC Batch: 147045		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	181	54	333	211	63	333	215	64
Acenaphthene	55	130	333	205	62	333	236	71	333	246	74
Acenaphthylene	55	130	333	199	60	333	230	69	333	239	72
Anthracene	66	130	333	239	72	333	253	76	333	273	82
Benzo(a)anthracene	55	130	333	224	67	333	224	67	333	234	70
Benzo(a)pyrene	56	130	333	242	73	333	241	72	333	243	73
Benzo(b)fluoranthene	53	130	333	254	76	333	244	73	333	248	74
Benzo(g,h,i)perylene	51	130	333	236	71	333	232	70	333	246	74
Benzo(k)fluoranthene	52	130	333	234	70	333	241	72	333	271	81
Chrysene	58	130	333	236	71	333	237	71	333	252	76
Dibenz(a,h)anthracene	55	130	333	237	71	333	235	71	333	246	74
Fluoranthene	62	130	333	230	69	333	236	71	333	253	76
Fluorene	58	130	333	213	64	333	235	71	333	248	74
Indeno(1,2,3-cd)pyrene	54	130	333	235	70	333	233	70	333	244	73
Naphthalene	41	130	333	173	52	333	189	57	333	189	57
Phenanthrene	60	130	333	220	66	333	229	69	333	246	74
Pyrene	51	130	333	230	69	333	232	70	333	246	74

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 147046			QC Batch: 147198			QC Batch: 147679		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	248	74	333	277	83	333	188	56
Acenaphthene	55	130	333	276	83	333	310	93	333	227	68
Acenaphthylene	55	130	333	270	81	333	299	90	333	218	65
Anthracene	66	130	333	305	92	333	344	103	333	291	87
Benzo(a)anthracene	55	130	333	273	82	333	298	89	333	239	72
Benzo(a)pyrene	56	130	333	305	92	333	338	102	333	299	90
Benzo(b)fluoranthene	53	130	333	318	95	333	330	99	333	260	78
Benzo(g,h,i)perylene	51	130	333	285	85	333	315	94	333	269	81
Benzo(k)fluoranthene	52	130	333	285	86	333	328	98	333	316	95
Chrysene	58	130	333	290	87	333	325	98	333	280	84
Dibenz(a,h)anthracene	55	130	333	282	85	333	315	95	333	270	81
Fluoranthene	62	130	333	286	86	333	320	96	333	272	82
Fluorene	58	130	333	279	84	333	311	93	333	239	72
Indeno(1,2,3-cd)pyrene	54	130	333	281	84	333	313	94	333	270	81
Naphthalene	41	130	333	220	66	333	256	77	333	185	55
Phenanthrene	60	130	333	276	83	333	307	92	333	248	75
Pyrene	51	130	333	286	86	333	315	95	333	264	79

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 3

Parameter	Rec Limits (%)		QC Batch: 147844			QC Batch: 148018			QC Batch: 148053		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	214	64	333	198	60	333	210	63
Acenaphthene	55	130	333	238	71	333	212	64	333	231	69
Acenaphthylene	55	130	333	232	70	333	206	62	333	223	67
Anthracene	66	130	333	266	80	333	227	68	333	248	74
Benzo(a)anthracene	55	130	333	215	64	333	198	60	333	223	67
Benzo(a)pyrene	56	130	333	252	76	333	212	63	333	245	73
Benzo(b)fluoranthene	53	130	333	239	72	333	216	65	333	240	72
Benzo(g,h,i)perylene	51	130	333	218	65	333	206	62	333	250	75
Benzo(k)fluoranthene	52	130	333	249	75	333	212	64	333	238	71
Chrysene	58	130	333	246	74	333	208	62	333	229	69
Dibenz(a,h)anthracene	55	130	333	225	68	333	204	61	333	251	75
Fluoranthene	62	130	333	241	72	333	207	62	333	232	70
Fluorene	58	130	333	235	71	333	209	63	333	230	69
Indeno(1,2,3-cd)pyrene	54	130	333	223	67	333	204	61	333	247	74
Naphthalene	41	130	333	202	61	333	195	59	333	189	57
Phenanthrene	60	130	333	229	69	333	206	62	333	230	69
Pyrene	51	130	333	235	71	333	209	63	333	228	68

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 4

Parameter	Rec Limits (%)		QC Batch: 148109			QC Batch: 148256			QC Batch: 148259		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	218	65	333	197	59	333	197	59
Acenaphthene	55	130	333	235	70	333	213	64	333	215	64
Acenaphthylene	55	130	333	228	68	333	207	62	333	210	63
Anthracene	66	130	333	255	77	333	232	70	333	234	70
Benzo(a)anthracene	55	130	333	230	69	333	208	63	333	212	64
Benzo(a)pyrene	56	130	333	246	74	333	228	69	333	229	69
Benzo(b)fluoranthene	53	130	333	268	80	333	224	67	333	222	67
Benzo(g,h,i)perylene	51	130	333	254	76	333	235	70	333	237	71
Benzo(k)fluoranthene	52	130	333	226	68	333	219	66	333	223	67
Chrysene	58	130	333	236	71	333	215	65	333	215	64
Dibenz(a,h)anthracene	55	130	333	255	76	333	237	71	333	240	72
Fluoranthene	62	130	333	238	72	333	216	65	333	217	65
Fluorene	58	130	333	234	70	333	212	64	333	213	64
Indeno(1,2,3-cd)pyrene	54	130	333	251	75	333	232	70	333	235	70
Naphthalene	41	130	333	210	63	333	191	57	333	186	56
Phenanthrene	60	130	333	234	70	333	214	64	333	214	64
Pyrene	51	130	333	234	70	333	211	63	333	215	65

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 5

Parameter	Rec Limits (%)		QC Batch: 148430			QC Batch: 148444			QC Batch: 148586		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	179	54	333	221	66	333	240	72
Acenaphthene	55	130	333	204	61	333	241	72	333	268	80
Acenaphthylene	55	130	333	197	59	333	234	70	333	256	77
Anthracene	66	130	333	232	69	333	261	78	333	295	89
Benzo(a)anthracene	55	130	333	208	63	333	233	70	333	269	81
Benzo(a)pyrene	56	130	333	278	83	333	295	89	333	299	90
Benzo(b)fluoranthene	53	130	333	277	83	333	306	92	333	327	98
Benzo(g,h,i)perylene	51	130	333	282	85	333	311	93	333	297	89
Benzo(k)fluoranthene	52	130	333	260	78	333	294	88	333	266	80
Chrysene	58	130	333	215	64	333	241	72	333	272	82
Dibenz(a,h)anthracene	55	130	333	286	86	333	316	95	333	309	93
Fluoranthene	62	130	333	216	65	333	241	72	333	278	83
Fluorene	58	130	333	207	62	333	238	71	333	272	82
Indeno(1,2,3-cd)pyrene	54	130	333	281	84	333	311	93	333	303	91
Naphthalene	41	130	333	163	49	333	207	62	333	218	66
Phenanthrene	60	130	333	212	64	333	239	72	333	273	82
Pyrene	51	130	333	212	63	333	239	72	333	269	81

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 6

Parameter	Rec Limits (%)		QC Batch: 148722			QC Batch: 148723			QC Batch: 149197		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	211	63	333	192	57	333	233	70
Acenaphthene	55	130	333	230	69	333	211	63	333	242	73
Acenaphthylene	55	130	333	223	67	333	202	61	333	234	70
Anthracene	66	130	333	250	75	333	248	74	333	270	81
Benzo(a)anthracene	55	130	333	225	68	333	225	67	333	229	69
Benzo(a)pyrene	56	130	333	251	75	333	245	74	333	266	80
Benzo(b)fluoranthene	53	130	333	261	78	333	257	77	333	259	78
Benzo(g,h,i)perylene	51	130	333	245	74	333	239	72	333	248	74
Benzo(k)fluoranthene	52	130	333	234	70	333	228	68	333	242	73
Chrysene	58	130	333	232	70	333	239	72	333	251	75
Dibenz(a,h)anthracene	55	130	333	253	76	333	253	76	333	260	78
Fluoranthene	62	130	333	232	70	333	234	70	333	249	75
Fluorene	58	130	333	229	69	333	215	65	333	238	71
Indeno(1,2,3-cd)pyrene	54	130	333	248	74	333	246	74	333	255	77
Naphthalene	41	130	333	199	60	333	169	51	333	219	66
Phenanthrene	60	130	333	232	69	333	225	68	333	241	72
Pyrene	51	130	333	231	69	333	231	69	333	240	72

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 7

Parameter	Rec Limits (%)		QC Batch: 149348			QC Batch: 149754			QC Batch: 149755		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	257	77	333	207	62	333	287	86
Acenaphthene	55	130	333	258	77	333	216	65	333	296	89
Acenaphthylene	55	130	333	254	76	333	209	63	333	288	86
Anthracene	66	130	333	276	83	333	231	69	333	326	98
Benzo(a)anthracene	55	130	333	251	75	333	210	63	333	281	84
Benzo(a)pyrene	56	130	333	275	83	333	226	68	333	321	96
Benzo(b)fluoranthene	53	130	333	295	89	333	236	71	333	309	93
Benzo(g,h,i)perylene	51	130	333	276	83	333	237	71	333	264	79
Benzo(k)fluoranthene	52	130	333	251	75	333	215	65	333	311	93
Chrysene	58	130	333	256	77	333	217	65	333	299	90
Dibenz(a,h)anthracene	55	130	333	288	86	333	236	71	333	298	89
Fluoranthene	62	130	333	257	77	333	217	65	333	303	91
Fluorene	58	130	333	256	77	333	214	64	333	296	89
Indeno(1,2,3-cd)pyrene	54	130	333	288	86	333	240	72	333	296	89
Naphthalene	41	130	333	232	70	333	185	56	333	257	77
Phenanthrene	60	130	333	255	76	333	212	64	333	293	88
Pyrene	51	130	333	258	77	333	215	64	333	299	90

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 8

Parameter	Rec Limits (%)		QC Batch: 150041			QC Batch: 150176			QC Batch: 150317		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	244	73	333	217	65	333	207	62
Acenaphthene	55	130	333	262	79	333	249	75	333	217	65
Acenaphthylene	55	130	333	254	76	333	237	71	333	210	63
Anthracene	66	130	333	287	86	333	283	85	333	237	71
Benzo(a)anthracene	55	130	333	255	77	333	237	71	333	211	63
Benzo(a)pyrene	56	130	333	270	81	333	277	83	333	221	66
Benzo(b)fluoranthene	53	130	333	297	89	333	243	73	333	236	71
Benzo(g,h,i)perylene	51	130	333	295	89	333	229	69	333	242	73
Benzo(k)fluoranthene	52	130	333	267	80	333	287	86	333	230	69
Chrysene	58	130	333	265	79	333	262	79	333	225	68
Dibenz(a,h)anthracene	55	130	333	297	89	333	233	70	333	240	72
Fluoranthene	62	130	333	269	81	333	259	78	333	219	66
Fluorene	58	130	333	264	79	333	251	75	333	217	65
Indeno(1,2,3-cd)pyrene	54	130	333	301	90	333	238	72	333	228	69
Naphthalene	41	130	333	207	62	333	185	55	333	194	58
Phenanthrene	60	130	333	262	79	333	248	74	333	212	64
Pyrene	51	130	333	263	79	333	253	76	333	217	65

Table 3-23. Sediment Method 8270-SIM LCS Results Summary Cont 9

Parameter	Rec Limits (%)		QC Batch: 150398		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	259	78
Acenaphthene	55	130	333	273	82
Acenaphthylene	55	130	333	265	79
Anthracene	66	130	333	302	91
Benzo(a)anthracene	55	130	333	255	77
Benzo(a)pyrene	56	130	333	301	90
Benzo(b)fluoranthene	53	130	333	267	80
Benzo(g,h,i)perylene	51	130	333	306	92
Benzo(k)fluoranthene	52	130	333	302	91
Chrysene	58	130	333	278	84
Dibenz(a,h)anthracene	55	130	333	304	91
Fluoranthene	62	130	333	278	83
Fluorene	58	130	333	270	81
Indeno(1,2,3-cd)pyrene	54	130	333	306	92
Naphthalene	41	130	333	232	70
Phenanthrene	60	130	333	268	80
Pyrene	51	130	333	264	79

Table 3-24. Water Method 8270-SIM LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 200-64113			QC Batch: 200-64273			QC Batch: 200-64903		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2-Methylnaphthalene	55	105	0.400	0.312	78	0.400	0.293	73	0.400	0.360	90
	55	105				0.400	0.367	92			
Acenaphthene	55	110	0.400	0.350	88	0.400	0.321	80	0.400	0.370	93
	55	110				0.400	0.354	88			
Acenaphthylene	55	110	0.400	0.374	93	0.400	0.321	80	0.400	0.361	90
	55	110				0.400	0.354	89			
Anthracene	55	110	0.400	0.312	78	0.400	0.330	83	0.400	0.358	89
	55	110				0.400	0.359	90			
Benzo[a]anthracene	55	120	0.400	0.461	115	0.400	0.332	83	0.400	0.365	91
	55	120				0.400	0.363	91			
Benzo[a]pyrene	50	120	0.400	0.365	91	0.400	0.332	83	0.400	0.352	88
	50	120				0.400	0.361	90			
Benzo[b]fluoranthene	45	120	0.400	0.504 ^ *	126	0.400	0.294 ^	73	0.400	0.341 ^	85
	45	120				0.400	0.345 ^	86			
Benzo[g,h,i]perylene	30	125	0.400	0.373	93	0.400	0.337	84	0.400	0.412	103
	30	125				0.400	0.342	86			
Benzo[k]fluoranthene	45	120	0.400	0.317	79	0.400	0.326	81	0.400	0.353	88
	45	120				0.400	0.339	85			
Chrysene	45	115	0.400	0.292	73	0.400	0.316	79	0.400	0.362	90
	45	115				0.400	0.340	85			
Dibenz(a,h)anthracene	30	130	0.400	0.421	105	0.400	0.344	86	0.400	0.388	97
	30	130				0.400	0.377	94			
Fluoranthene	45	120	0.400	0.356	89	0.400	0.346	86	0.400	0.363	91
	45	120				0.400	0.378	94			
Fluorene	55	110	0.400	0.375	94	0.400	0.329	82	0.400	0.368	92
	55	110				0.400	0.362	91			
Indeno[1,2,3-cd]pyrene	30	130	0.400	0.392	98	0.400	0.335	84	0.400	0.390	97
	30	130				0.400	0.350	88			
Naphthalene	50	105	0.400	0.333	83	0.400	0.310	78	0.400	0.367	92
	50	105				0.400	0.359	90			
Phenanthrene	50	110	0.400	0.379	95	0.400	0.312	78	0.400	0.364	91
	50	110				0.400	0.339	85			
Pyrene	50	115	0.400	0.332	83	0.400	0.279	70	0.400	0.372	93
	50	115				0.400	0.301	75			

Table 3-24. Water Method 8270-SIM LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 200-65095			QC Batch: 200-65550			QC Batch: 200-65764		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2-Methylnaphthalene	55	105	0.400	0.229	57	0.400	0.336	84	0.400	0.310	78
	55	105							0.400	0.284	71
Acenaphthene	55	110	0.400	0.238	59	0.400	0.349	87	0.400	0.315	79
	55	110							0.400	0.291	73
Acenaphthylene	55	110	0.400	0.252	63	0.400	0.382	96	0.400	0.344	86
	55	110							0.400	0.312	78
Anthracene	55	110	0.400	0.249	62	0.400	0.378	95	0.400	0.337	84
	55	110							0.400	0.322	81
Benzo[a]anthracene	55	120	0.400	0.262	65	0.400	0.387	97	0.400	0.341	85
	55	120							0.400	0.330	82
Benzo[a]pyrene	50	120	0.400	0.242	60	0.400	0.364	91	0.400	0.323	81
	50	120							0.400	0.312	78
Benzo[b]fluoranthene	45	120	0.400	0.243	61	0.400	0.347	87	0.400	0.310	78
	45	120							0.400	0.337	84
Benzo[g,h,i]perylene	30	125	0.400	0.253	63	0.400	0.384	96	0.400	0.359	90
	30	125							0.400	0.306	77
Benzo[k]fluoranthene	45	120	0.400	0.232	58	0.400	0.331	83	0.400	0.301	75
	45	120							0.400	0.315	79
Chrysene	45	115	0.400	0.235	59	0.400	0.344	86	0.400	0.304	76
	45	115							0.400	0.296	74
Dibenz(a,h)anthracene	30	130	0.400	0.249	62	0.400	0.382	95	0.400	0.343	86
	30	130							0.400	0.301	75
Fluoranthene	45	120	0.400	0.238	59	0.400	0.355	89	0.400	0.330	82
	45	120							0.400	0.325	81
Fluorene	55	110	0.400	0.243	61	0.400	0.360	90	0.400	0.323	81
	55	110							0.400	0.300	75
Indeno[1,2,3-cd]pyrene	30	130	0.400	0.242	60	0.400	0.372	93	0.400	0.344	86
	30	130							0.400	0.303	76
Naphthalene	50	105	0.400	0.237	59	0.400	0.342	85	0.400	0.319	80
	50	105							0.400	0.290	72
Phenanthrene	50	110	0.400	0.227	57	0.400	0.341	85	0.400	0.303	76
	50	110							0.400	0.296	74
Pyrene	50	115	0.400	0.220	55	0.400	0.316	79	0.400	0.258	65
	50	115							0.400	0.259	65

Table 3-24. Water Method 8270-SIM LCS Results Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 200-65973			QC Batch: 200-66593		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2-Methylnaphthalene	55	105	0.400	0.336	84	0.400	0.327	82
	55	105				0.400	0.336	84
Acenaphthene	55	110	0.400	0.330	83	0.400	0.355	89
	55	110				0.400	0.350	87
Acenaphthylene	55	110	0.400	0.354	88	0.400	0.351	88
	55	110				0.400	0.352	88
Anthracene	55	110	0.400	0.342	85	0.400	0.352	88
	55	110				0.400	0.346	87
Benzo[a]anthracene	55	120	0.400	0.373	93	0.400	0.399	100
	55	120				0.400	0.393	98
Benzo[a]pyrene	50	120	0.400	0.338	85	0.400	0.366	92
	50	120				0.400	0.361	90
Benzo[b]fluoranthene	45	120	0.400	0.342	86	0.400	0.368	92
	45	120				0.400	0.370	93
Benzo[g,h,i]perylene	30	125	0.400	0.355	89	0.400	0.371	93
	30	125				0.400	0.352	88
Benzo[k]fluoranthene	45	120	0.400	0.320	80	0.400	0.345	86
	45	120				0.400	0.348	87
Chrysene	45	115	0.400	0.331	83	0.400	0.354	89
	45	115				0.400	0.346	87
Dibenz(a,h)anthracene	30	130	0.400	0.310	77	0.400	0.388	97
	30	130				0.400	0.374	93
Fluoranthene	45	120	0.400	0.327	82	0.400	0.362	91
	45	120				0.400	0.339	85
Fluorene	55	110	0.400	0.337	84	0.400	0.360	90
	55	110				0.400	0.357	89
Indeno[1,2,3-cd]pyrene	30	130	0.400	0.330	82	0.400	0.387	97
	30	130				0.400	0.373	93
Naphthalene	50	105	0.400	0.344	86	0.400	0.342	86
	50	105				0.400	0.356	89
Phenanthrene	50	110	0.400	0.320	80	0.400	0.349	87
	50	110				0.400	0.337	84
Pyrene	50	115	0.400	0.326	81	0.400	0.345	86
	50	115				0.400	0.339	85

3.3.8 Field Duplicates

Field duplicates generally did not exhibit good agreement for most of analytes with RPD values >30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. Many samples exceeded 30% at more than twice the limit of quantitation therefore, these analytes for these samples and their duplicate only will be qualified as estimated ("J").

The results of the field duplicate analyses are given in Table 3-25.

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	942		181	303	J	527	102.7	427	M1	20.2	339		20.0	23.0
Acenaphthene	508		181	354	J	527	35.7	96		20.2	72.2		20.0	28.3
Acenaphthylene	244		181	264	U	527	NC	48.6		20.2	41.2		20.0	16.5
Anthracene	985		181	905		527	8.5	126		20.2	96.9		20.0	26.1
Benzo(a)anthracene	1920		181	2460		527	24.7	115		20.2	82.5		20.0	32.9
Benzo(a)pyrene	2080		181	3230		527	43.3	118		20.2	85.9		20.0	31.5
Benzo(b)fluoranthene	1910		181	3000		527	44.4	79.4		20.2	46.4		20.0	52.5
Benzo(g,h,i)perylene	1260		181	1910		527	41.0	46.6		20.2	33.8		20.0	31.8
Benzo(k)fluoranthene	2020		181	3040		527	40.3	76.3		20.2	56.5		20.0	29.8
Chrysene	2500		181	3150		527	23.0	135		20.2	93.3		20.0	36.5
Dibenz(a,h)anthracene	445		181	681		527	41.9	19.0	J	20.2	13.3	J	20.0	35.3
Fluoranthene	4970		181	6100		527	20.4	181	L2	20.2	122	L2	20.0	38.9
Fluorene	598		181	481	J	527	21.7	101		20.2	73.9		20.0	31.0
Indeno(1,2,3-cd)pyrene	1170		181	1780		527	41.4	43		20.2	28.4		20.0	40.9
Naphthalene	825		181	283	J	527	97.8	634	M1, R1	20.2	401		20.0	45.0
Phenanthrene	3790		181	4210		527	10.5	407	M1	20.2	305		20.0	28.7
Pyrene	4390		181	5040		527	13.8	244		20.2	179		20.0	30.7

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 1

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	96		19.6	361		152	116.0	22900		7910	36000		12800	44.5
Acenaphthene	28.3		19.6	144	J	152	134.3	18200		7910	32200		12800	55.6
Acenaphthylene	9.8	U	19.6	92.8	J	152	NC	3960	U	7910	6390	U	12800	0.0
Anthracene	27.9		19.6	341		152	169.7	4590	J	7910	7840	J	12800	52.3
Benzo(a)anthracene	25.3		19.6	699		152	186.0	3960	U	7910	6390	U	12800	0.0
Benzo(a)pyrene	21.6		19.6	688		152	187.8	1410	U	7910	3060	J	12800	NC
Benzo(b)fluoranthene	14.0	J	19.6	738		152	192.6	3960	U	7910	6390	U	12800	0.0
Benzo(g,h,i)perylene	10.8	J	19.6	462		152	190.9	3960	U	7910	6390	U	12800	0.0
Benzo(k)fluoranthene	15.3	J	19.6	693		152	191.4	1390	U	7910	2250	U	12800	0.0
Chrysene	32.1		19.6	937		152	186.8	3960	U	7910	6390	U	12800	0.0
Dibenz(a,h)anthracene	9.8	U	19.6	170		152	NC	3960	U	7910	6390	U	12800	0.0
Fluoranthene	45.5		19.6	1620		152	189.1	3960	U	7910	8080	J	12800	NC
Fluorene	20		19.6	217		152	166.2	4850	J	7910	8350	J	12800	53.0
Indeno(1,2,3-cd)pyrene	9.8	U	19.6	403		152	NC	3960	U	7910	6390	U	12800	0.0
Naphthalene	113		19.6	394		152	110.8	148000		7910	205000		12800	32.3
Phenanthrene	97.4		19.6	1220		152	170.4	12700		7910	22200		12800	54.4
Pyrene	56		19.6	1560		152	186.1	5410	J	7910	11000	J	12800	68.1

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 2

Parameter	Sample ID: 111313084			Sample ID: 111313095			RPD	Sample ID: 111513201			Sample ID: 111513208			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	1940		173	236		34.8	<i>156.6</i>	716		171	207		42.5	<i>110.3</i>
Acenaphthene	773		173	100		34.8	<i>154.2</i>	238		171	81.1		42.5	<i>98.3</i>
Acenaphthylene	256		173	32.0	J	34.8	<i>155.6</i>	118	J	171	38.8	J	42.5	<i>101.0</i>
Anthracene	1220		173	126		34.8	<i>162.6</i>	420		171	154		42.5	<i>92.7</i>
Benzo(a)anthracene	1370		173	190		34.8	<i>151.3</i>	976		171	315		42.5	<i>102.4</i>
Benzo(a)pyrene	1190		173	184		34.8	<i>146.4</i>	1310		171	426		42.5	<i>101.8</i>
Benzo(b)fluoranthene	1070		173	226		34.8	<i>130.2</i>	1560		171	468		42.5	<i>107.7</i>
Benzo(g,h,i)perylene	720		173	137		34.8	<i>136.1</i>	681		171	234		42.5	<i>97.7</i>
Benzo(k)fluoranthene	1260		173	156		34.8	<i>155.9</i>	1290		171	407		42.5	<i>104.1</i>
Chrysene	1820		173	270		34.8	<i>148.3</i>	1410		171	431		42.5	<i>106.4</i>
Dibenz(a,h)anthracene	249		173	39.2		34.8	<i>145.6</i>	243		171	83.8		42.5	<i>97.4</i>
Fluoranthene	3260		173	491		34.8	<i>147.6</i>	2560		171	794		42.5	<i>105.3</i>
Fluorene	910		173	99.7		34.8	<i>160.5</i>	301		171	96		42.5	<i>103.3</i>
Indeno(1,2,3-cd)pyrene	617		173	97.4		34.8	<i>145.5</i>	636		171	208		42.5	<i>101.4</i>
Naphthalene	702		173	83.3		34.8	<i>157.6</i>	303		171	86.1		42.5	<i>111.5</i>
Phenanthrene	3800		173	497		34.8	<i>153.7</i>	2000		171	641		42.5	<i>102.9</i>
Pyrene	3670		173	545		34.8	<i>148.3</i>	2780		171	830		42.5	<i>108.0</i>

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 3

Parameter	Sample ID: 111813251			Sample ID: 111813258			RPD	Sample ID: 112213444			Sample ID: 112213446			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	20700		1100	27200		1330	27.1	31.2		19.4	15.5	J	19.3	67.2
Acenaphthene	9010		1100	10900		1330	19.0	13.8	J	19.4	9.7	U	19.3	NC
Acenaphthylene	1800		1100	1770		1330	1.7	9.7	U	19.4	9.7	U	19.3	0.0
Anthracene	6680		1100	7340		1330	9.4	10.4	J	19.4	9.7	U	19.3	NC
Benzo(a)anthracene	4470		1100	4650		1330	3.9	9.7	U	19.4	9.7	U	19.3	0.0
Benzo(a)pyrene	4710		1100	4790		1330	1.7	7.0	J	19.4	3.4	U	19.3	NC
Benzo(b)fluoranthene	3000		1100	2800		1330	6.9	9.7	U	19.4	9.7	U	19.3	0.0
Benzo(g,h,i)perylene	2140		1100	2200		1330	2.8	9.7	U	19.4	9.7	U	19.3	0.0
Benzo(k)fluoranthene	2580		1100	2900		1330	11.7	3.8	J	19.4	3.4	U	19.3	NC
Chrysene	4870		1100	5220		1330	6.9	10.8	J	19.4	9.7	U	19.3	NC
Dibenz(a,h)anthracene	660	J	1100	709	J	1330	7.2	9.7	U	19.4	9.7	U	19.3	0.0
Fluoranthene	7650		1100	8430		1330	9.7	13.6	J	19.4	9.7	U	19.3	NC
Fluorene	4930		1100	5850		1330	17.1	9.7	U	19.4	9.7	U	19.3	0.0
Indeno(1,2,3-cd)pyrene	1640		1100	1680		1330	2.4	9.7	U	19.4	9.7	U	19.3	0.0
Naphthalene	20800		1100	10600		1330	65.0	94.0		19.4	43.2		19.3	74.1
Phenanthrene	17900		1100	20600		1330	14.0	48.4		19.4	24.3		19.3	66.3
Pyrene	11200		1100	12000		1330	6.9	17.2	J	19.4	9.7	U	19.3	NC

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 4

Parameter	Sample ID: 112613504			Sample ID: 112613517			RPD	Sample ID: 120213557			Sample ID: 120213570			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	4380		267	47300		5380	<i>166.1</i>	73900		13800	87400		14000	16.7
Acenaphthene	1220		267	18200		5380	<i>174.9</i>	26300		13800	30500		14000	14.8
Acenaphthylene	561		267	2910	J	5380	<i>135.4</i>	6890	U	13800	6980	U	14000	0.0
Anthracene	1080		267	9340		5380	<i>158.5</i>	13200	J	13800	14300		14000	8.0
Benzo(a)anthracene	1100		267	4980	J	5380	<i>127.6</i>	6890	U	13800	8060	J	14000	NC
Benzo(a)pyrene	1250		267	5480		5380	<i>125.7</i>	6050	J	13800	6360	J	14000	5.0
Benzo(b)fluoranthene	808	1q	267	3960	J1q	5380	<i>132.2</i>	6890	U	13800	6980	U	14000	0.0
Benzo(g,h,i)perylene	661		267	3220	J	5380	<i>131.9</i>	6890	U	13800	6980	U	14000	0.0
Benzo(k)fluoranthene	906	1q	267	1690	J1q	5380	<i>60.4</i>	3670	J	13800	3780	J	14000	3.0
Chrysene	1320		267	5440		5380	<i>121.9</i>	8840	J	13800	10600	J	14000	18.1
Dibenz(a,h)anthracene	206	J	267	2690	U	5380	NC	6890	U	13800	6980	U	14000	0.0
Fluoranthene	1920		267	8810		5380	<i>128.4</i>	13800	J	13800	15400		14000	11.0
Fluorene	895		267	9300		5380	<i>164.9</i>	12100	J	13800	15000		14000	21.4
Indeno(1,2,3-cd)pyrene	483		267	2690	U	5380	NC	6890	U	13800	6980	U	14000	0.0
Naphthalene	1370		267	74700		5380	<i>192.8</i>	163000		13800	187000		14000	13.7
Phenanthrene	3360		267	27800		5380	<i>156.9</i>	39400		13800	46200		14000	15.9
Pyrene	2540		267	13800		5380	<i>137.8</i>	20300		13800	24300		14000	17.9

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 5

Parameter	Sample ID: 111113038			Sample ID: 111113041			RPD	Sample ID: 111913305			Sample ID: 111913307			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	10.4	U	20.8	12.2	J	20.9	NC	542	M1	25.7	134		24.0	120.7
Acenaphthene	22.6		20.8	17.7	J	20.9	24.3	179		25.7	51.3		24.0	110.9
Acenaphthylene	10.4	U	20.8	10.4	U	20.9	0.0	14.6	J	25.7	12.0	U	24.0	NC
Anthracene	34.5		20.8	15.3	J	20.9	77.1	109		25.7	54.3		24.0	67.0
Benzo(a)anthracene	77.4		20.8	49.3		20.9	44.4	39.5		25.7	23.0	J	24.0	52.8
Benzo(a)pyrene	81.7		20.8	59.3		20.9	31.8	33.2		25.7	15.4	J	24.0	73.3
Benzo(b)fluoranthene	90.4		20.8	44.3		20.9	68.4	26.1		25.7	12.0	U	24.0	NC
Benzo(g,h,i)perylene	44.9		20.8	34.2		20.9	27.1	16.9	J	25.7	12.0	U	24.0	NC
Benzo(k)fluoranthene	74.2		20.8	61		20.9	19.5	15.4	J	25.7	9.3	J	24.0	49.4
Chrysene	114		20.8	67.3		20.9	51.5	45		25.7	26.4		24.0	52.1
Dibenz(a,h)anthracene	15.5	J	20.8	10.4	U	20.9	NC	12.9	U	25.7	12.0	U	24.0	0.0
Fluoranthene	252		20.8	95.5		20.9	90.1	97		25.7	63.7		24.0	41.4
Fluorene	20.1	J	20.8	10.4	U	20.9	NC	100		25.7	33		24.0	100.8
Indeno(1,2,3-cd)pyrene	36.6		20.8	26.6		20.9	31.6	12.9	U	25.7	12.0	U	24.0	0.0
Naphthalene	10.4	U	20.8	10.4	U	20.9	0.0	493	M1	25.7	149		24.0	107.2
Phenanthrene	193		20.8	53.8		20.9	112.8	336		25.7	160		24.0	71.0
Pyrene	196		20.8	93.7		20.9	70.6	120		25.7	82.8		24.0	36.7

Table 3-25. Sediment Method 8270-SIM Field Duplicate Results Cont 6

Parameter	Sample ID: 112013358			Sample ID: 112013364			RPD	Sample ID: 120413619			Sample ID: 120413632			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	270	M1, R1	106	357		106	27.8	106		84.6	43.0	J	84.7	84.6
Acenaphthene	52.9	U	106	96.7	J	106	NC	144		84.6	64.7	J	84.7	76.0
Acenaphthylene	52.9	U	106	53.0	U	106	0.0	85.9		84.6	43.4	J	84.7	65.7
Anthracene	52.9	U	106	53.0	U	106	0.0	353		84.6	138		84.7	87.6
Benzo(a)anthracene	52.9	U	106	53.0	U	106	0.0	918		84.6	378		84.7	83.3
Benzo(a)pyrene	18.8	U	106	36.3	J	106	NC	1110		84.6	453		84.7	84.1
Benzo(b)fluoranthene	52.9	U1q	106	53.0	U1q	106	0.0	1050		84.6	500		84.7	71.0
Benzo(g,h,i)perylene	52.9	U	106	53.0	U	106	0.0	743		84.6	353		84.7	71.2
Benzo(k)fluoranthene	18.6	U1q	106	18.7	U1q	106	NC	1040		84.6	328		84.7	104.1
Chrysene	52.9	U	106	53.0	U	106	0.0	1230	M1	84.6	556		84.7	75.5
Dibenz(a,h)anthracene	52.9	U	106	53.0	U	106	0.0	227		84.6	94.5		84.7	82.4
Fluoranthene	52.9	U	106	63.8	J	106	NC	2340	M1	84.6	1040		84.7	76.9
Fluorene	52.9	U	106	53.0	U	106	0.0	175		84.6	75.4	J	84.7	79.6
Indeno(1,2,3-cd)pyrene	52.9	U	106	53.0	U	106	0.0	627		84.6	253		84.7	85.0
Naphthalene	2350	M1, R1	106	2110		106	10.8	101		84.6	54.6	J	84.7	59.6
Phenanthrene	52.9	U	106	159		106	NC	1470	M1	84.6	599		84.7	84.2
Pyrene	52.9	U	106	95.1	J	106	NC	2190	M1	84.6	937		84.7	80.1

3.4 SW-846 Method 8082A, Polychlorinated Biphenyls (PCBs)

3.4.1 Summary

Sediment samples were analyzed for polychlorinated biphenyls (PCBs) using SW-846 Method 8082A. Method 8082A employs gas chromatographic separation with a halogen specific electron capture detector. Identification is accomplished by comparing retention times and elution patterns to known standards and confirmed by analysis on a second gas chromatographic column of dissimilar phase.

Due to an error at sample log-in, PCB analysis was requested for SDG 4088486, but samples were not logged or immediately analyzed by the laboratory. Analyses were subsequently performed well after (i.e., months) sample receipt. However, neither the National Functional Guidelines nor the Multi-site QAPP establish technical holding times for PCBs in a soil/solid matrix. In addition, the holding time for PCBs in all matrices has been re-established by EPA to be "none" as defined in SW-846, Chapter 4. Hence, no action is taken to qualify data based upon the delayed extraction and analysis for PCBs.

The results of the QC review are presented below.

3.4.2 Sample Receipt

All samples were received by the laboratory in good condition, cold ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) and intact. All samples were prepared and analyzed within the prescribed holding times.

3.4.3 Method Blanks

A laboratory method blank was prepared and analyzed for each analytical batch. The sediment method blank consisted of an aliquot of sodium sulfate extracted as a sample. None of the method blanks associated with these sample analyses showed any contamination for any of the target compounds above the detection limit. Hence, no data are qualified due to method blank contamination.

In addition to the method blanks, equipment blanks were also submitted and analyzed. None of the blanks showed any contamination for any other the PCB mixtures. No data are qualified as a consequence of the equipment blank results.

The method blank results are summarized in Tables 3-26 and 3-27.

Table 3-26. Sediment Method 8082 Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 145766	QC Batch: 146001	QC Batch: 146479	QC Batch: 146485	QC Batch: 146625	QC Batch: 149951	QC Batch: 154823
PCB-1016 (Aroclor 1016)	25.0 U						
PCB-1221 (Aroclor 1221)	25.0 U						
PCB-1232 (Aroclor 1232)	25.0 U						
PCB-1242 (Aroclor 1242)	25.0 U						
PCB-1248 (Aroclor 1248)	25.0 U						
PCB-1254 (Aroclor 1254)	25.0 U						
PCB-1260 (Aroclor 1260)	25.0 U						

Table 3-27. Water Method 8082 Method Blank Results Summary (µg/L)

Parameter	QC Batch: 200-64235	QC Batch: 200-64283	QC Batch: 200-64627	QC Batch: 200-64648	QC Batch: 200-66529
PCB-1016	0.031 U				
PCB-1221	0.041 U				
PCB-1232	0.065 U				
PCB-1242	0.037 U				
PCB-1248	0.034 U				
PCB-1254	0.044 U				
PCB-1260	0.030 U				
PCB-1262	0.044 U				
PCB-1268	0.020 U				

3.4.4 Calibration

All initial calibration acceptance criteria were met for all of the analytes. Multiple calibration verifications (CCVs) were performed in the course of these analyses.

All of the CCV results associated with these analyses gave passing results (i.e., <25% D) using CLP NFG for PCBs. Hence, no data are qualified as consequence of the PCB calibration data.

3.4.5 Surrogate Compound Recoveries

Two surrogates, tetrachloro-*m*-xylene (TCMX) and decachlorobiphenyl (DCB) were spiked into each field sample to monitor method recovery. Use of these two compounds as surrogates is consistent with the SW-846 guidance.

Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. Most failed samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Samples 102813265, 102913299, 102913300, 102913301, 110113386, 110113389, 110113395, 110113406, and 110513474 with little or no dilution had a recovery below the lower limit. Since the failed recovery is not attributable to dilution, positive results for this sample are qualified as estimated ("J"), non-detects will be qualified with a ("UJ").

The surrogate recoveries for all sample analyses are presented in Table 3-28 and 3-29.

Table 3-28. Sediment Method 8082 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Dilution	Decachloro-biphenyl		Tetrachloro- <i>m</i> -xylene	
			Limits:	48	130	40
4087646001	102813264	3	51		63	
4087646002	102813265	3	46	SO	56	
4087646003	102813266	4	48		62	
4087646004	102813273	5	50		56	
4087646005	102813277	1	65		66	
4087646006	102813281	4	57		69	
4087646007	102813282	5	55		61	
4087646008	102813283	4	53		62	
4087646009	102813284	4	56		64	
4087646010	102813287	1	65		71	
4087646011	102813288	1	64		69	
4087646012	102913291	3	59		71	
4087646013	102913292	1	52		66	
4087646014	102913293	4	63		69	
4087646015	102913299	1	47	SO	55	
4087646016	102913300	1	46	SO	54	
4087646017	102913301	1	46	SO	57	
4087646018	102913306	1	54		63	
4087646019	102913308	3	53		69	

Lab Sample Number	Field ID	Dilution	Decachloro-biphenyl		Tetrachloro-m-xylene	
4087646020	102913309	2	51		65	
4087646021	102913310	3	82		75	
4087646022	102913313	1	79		76	
4087646023	102913317	1	81		77	
4087646024	102913325	1	83		80	
4087646025	102913327	10	87		77	
4087646026	102913328	20	0	S4	0	S4
4087646027	102913329	10	74		61	
4087646028	102913338	3	80		73	
4087646029	102913343	1	89		84	
4087646030	102913348	1	93		88	
4087646031	102913349	10	82		69	
4087646032	102913350	5	78		68	
4087646033	102913351	5	80		70	
4087646034	102913355	1	71		73	
4087646035	102913361	1	91		85	
4088053001	110113375	50	0	S4	0	S4
4088053002	110113376	100	0	S4	0	S4
4088053003	110113377	50	0	S4	0	S4
4088053004	110113380	100	0	S4	0	S4
4088053005	110113386	1	39	S0	53	
4088053006	110113389	1	35	S0	48	
4088053007	110113390	1	49		58	
4088053008	110113392	100	0	S4	0	S4
4088053009	110113393	10	65		68	
4088053010	110113394	4	56		64	
4088053011	110113395	2	45	S0	52	
4088053012	110113399	1	49		53	
4088053013	110113406	1	42	S0	53	
4088053014	110113408	1	52		62	
4088053015	110113410	5	73		68	
4088053016	110113411	4	75		73	
4088053017	110113412	4	77		72	
4088053018	110113424	1	73		77	
4088053019	110113429	1	76		73	
4088053020	110413432	2	75		74	
4088053021	110413433	2	77		75	
4088053022	110413434	50	0	S4	0	S4
4088053023	110413441	1	73		76	

Lab Sample Number	Field ID	Dilution	Decachloro-biphenyl		Tetrachloro-m-xylene	
4088053024	110413443	1	77		74	
4088053025	110413448	100	0	S4	0	S4
4088053026	110413449	30	0	S4	0	S4
4088053027	110413450	50	0	S4	0	S4
4088053028	110413457	1	73		78	
4088053029	110413458	1	78		77	
4088053030	110413460	1	73		78	
4088053031	110413461	4	73		70	
4088053032	110413462	20	0	S4	0	S4
4088053033	110413463	1	88		86	
4088053034	110413466	1	91		90	
4088053035	110413470	1	85		85	
4088053036	110413471	1	86		83	
4088486001	110813504	5	69		78	
4088486002	110813505	5	68		72	
4088486003	110813506	5	58		68	
4088486004	110813510	5	64		67	
4088486005	110813515	1	55		68	
4088486006	110813517	1	62		70	
4088486007	110813518	1	67		70	

Table 3-29. Water Method 8082 Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	Decachloro-biphenyl		Tetrachloro-m-xylene	
			Limits:	30	150	55
200-19227-36	102813262	1	65		90	
			69		93	
200-19227-38	102913290	1	57		90	
			63		90	
200-19267-1	103013363	1	50		90	
			50		91	
200-19364-1	110113373	1	50		74	
			51		75	
200-19364-3	110413431	1	44		80	
			45		83	
200-19364-4	110513474	1	22	X	81	
			23	X	85	
200-19434-1	110713490	1	47		90	
			49		98	
200-19557-1	110813502	1	61		98	
			63		106	
200-20035-1	120613843	1	50		87	
			51		89	

3.4.6 Matrix Spike / Matrix Spike Duplicate

Matrix spike/matrix spiked duplicate (MS/MSD) analyses were performed on multiple samples. One of the PCB-1260 spikes for the MS/MSD analyses samples recovered outside the limits used by the laboratory due to being diluted by 100x. The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data alone. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The MS/MSD recoveries for all sample analyses are presented in Table 3-30.

Table 3-30. Sediment Method 8082 MS/MSD Results Summary

<i>Sample ID</i>	<i>Parameter</i>	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
102813277	PCB-1260	585	380	65	585	353	60	7	29.2 U	31
102913343	PCB-1260	605	536	89	605	548	90	2	30.3 U	31
110113376	PCB-1260	1180	5880 U	0	1180	0	0		5880 UM6	31
110413458	PCB-1260	569	481	85	569	468	82	3	28.4 U	31

3.4.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed for each analytical batch. None of the recoveries exceeded the laboratory's control limits for any of the PCB mixtures; hence there is no need for any further qualification of the data.

The laboratory control sample results are presented in Table 3-31 and 3-32.

Table 3-31. Sediment Method 8082 LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 145766			QC Batch: 146001			QC Batch: 146479		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
PCB-1260	70	130	500	418	84	500	488	98	500	430	86

Table 3-31. Sediment Method 8082 LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 146485			QC Batch: 146625			QC Batch: 149951			QC Batch: 154823		
	Lower	Upper	Spike (ug/kg)	Result (ug/kg)	Rec (%)	Spike (ug/kg)	Result (ug/kg)	Rec (%)	Spike (ug/kg)	Result (ug/kg)	Rec (%)	Spike (ug/kg)	Result (ug/kg)	Rec (%)
PCB-1260 (Aroclor 1260)	70	130	500	435	87	500	467	93	500	384	77	500	380	76

Table 3-32. Water Method 8082 LCS Summary

Parameter	Rec Limits (%)		QC Batch: 200-63929			QC Batch: 200-64235			QC Batch: 200-64283		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
PCB-1016	55	120	5.00	4.52	90	5.00	4.43	89	5.00	5.36	107
PCB-1260	60	125	5.00	4.21	84	5.00	4.32	86	5.00	5.47	109

Table 3-32. Water Method 8082 LCS Summary Cont.

Parameter	Rec Limits (%)		QC Batch: 200-64627			QC Batch: 200-64648			QC Batch: 200-66529		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
PCB-1016	55	120	5.00	4.17	83	5.00	4.22	84	5.00	4.45	89
PCB-1260	60	125	5.00	4.06	81	5.00	3.57	71	5.00	3.69	74

3.4.8 Field Duplicates

Field duplicates generally exhibited good agreement for most of analytes with RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. A few samples exceeded 30%RPD at more than twice the limit of quantitation. Therefore, these analytes for these samples and their duplicate only will be qualified as estimated ("J").

The results of the duplicate analyses are given in Table 3-33.

Table 3-33. Sediment Method 8082 Field Duplicate Results

Parameter	Sample ID: 102813265			Sample ID: 102813281			RPD	Sample ID: 102913343			Sample ID: 102913348			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
PCB, Total	2520		325	2530		396	0.4	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1016 (Aroclor 1016)	163	U	325	198	U	396	0.0	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1221 (Aroclor 1221)	163	U	325	198	U	396	0.0	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1232 (Aroclor 1232)	163	U	325	198	U	396	0.0	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1242 (Aroclor 1242)	1450		325	1590		396	9.2	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1248 (Aroclor 1248)	163	U	325	198	U	396	0.0	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1254 (Aroclor 1254)	752		325	710		396	5.7	30.3	U	60.5	30.0	U	60.0	0.0
PCB-1260 (Aroclor 1260)	319	J	325	228	J	396	33.3	30.3	U	60.5	30.0	U	60.0	0.0

Table 3-33. Sediment Method 8082 Field Duplicate Results Cont

Parameter	Sample ID: 110113390			Sample ID: 110113392			RPD	Sample ID: 110413457			Sample ID: 110413460			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
PCB, Total	29.5	U	58.9	34000		11400	NC	297		95.0	716		95.9	82.7
PCB-1016 (Aroclor 1016)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1221 (Aroclor 1221)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1232 (Aroclor 1232)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1242 (Aroclor 1242)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1248 (Aroclor 1248)	29.5	U	58.9	34000		11400	NC	297		95.0	716		95.9	82.7
PCB-1254 (Aroclor 1254)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0
PCB-1260 (Aroclor 1260)	29.5	U	58.9	5690	U	11400	0.0	47.5	U	95.0	47.9	U	95.9	0.0

3.5 Alkylated PAHs

3.5.1 Summary

Analysis for alkylated PAHs was performed using a method developed by the analytical laboratory. The method employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM). Results are reported as compound classes (e.g., "C2-Fluorenes") rather than specific alkylated moieties. The lab is not accredited under NELAP for the following parameters; 2-Methylnaphthalene, Benzo(a,b)fluoranthene, Benzo(e)pyrene, C1-Chrysenes, C1-Fluoranthenes/Pyrenes, C1-Fluorenes, C1-Naphthalenes, C1-Phenanthrenes/Anthracenes, C2-Chrysenes, C2-Fluorenes, C2-Naphthalenes, C2-Phenanthrenes/Anthracenes, C3-Chrysenes, C3-Fluorenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Chrysenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes, Naphthalene and, Perylene.

Samples 112613490, 112613503 and, 112013331 were extracted outside of holding time and therefore will be qualified with all positive results as estimated ("J"), and non-detect results as estimated ("UJ").

3.5.2 Method Blanks

The samples were prepared in a multiple preparation batches. None of the target compounds for this method gave a positive result. Therefore, no data are qualified due to method blank contamination.

The results for the method blanks are summarized in Table 3-34.

Table 3-34. Sediment Alkylated PAH by SIM Method Blank Results Summary (µg/Kg)

Parameter	QC Batch: 276509	QC Batch: 277680	QC Batch: 278046	QC Batch: 278384	QC Batch: 279425	QC Batch: 279577	QC Batch: 280237	QC Batch: 280539	QC Batch: 281203	QC Batch: 282377
2-Methylnaphthalene	0.48 U									
Acenaphthene	0.40 U									
Acenaphthylene	0.42 U									
Anthracene	0.47 U									
Benzo(a)anthracene	0.48 U									
Benzo(a)pyrene	0.49 U									
Benzo(a,b)fluoranthene	0.65 U									
Benzo(e)pyrene	0.49 U									
Benzo(g,h,i)perylene	0.48 U									
Benzo(k)fluoranthene	0.53 U									
C1-Chrysenes	5.0 U									
C1-Fluoranthenes/Pyrenes	5.0 U									
C1-Fluorenes	5.0 U									
C1-Naphthalenes	5.0 U									
C1-Phenanthrenes/Anthracenes	5.0 U									
C2-Chrysenes	5.0 U									
C2-Fluorenes	5.0 U									
C2-Naphthalenes	5.0 U									
C2-Phenanthrenes/Anthracenes	5.0 U									
C3-Chrysenes	5.0 U									
C3-Fluorenes	5.0 U									
C3-Naphthalenes	5.0 U									
C3-Phenanthrenes/Anthracenes	5.0 U									
C4-Chrysenes	5.0 U									
C4-Naphthalenes	5.0 U									
C4-Phenanthrenes/Anthracenes	5.0 U									
Chrysene	0.50 U									
Dibenz(a,h)anthracene	0.52 U									
Fluoranthene	0.55 U									
Fluorene	0.40 U									
Indeno(1,2,3-cd)pyrene	0.53 U									
Naphthalene	0.43 U									
Perylene	2.0 U									
Phenanthrene	0.44 U									
Pyrene	0.56 U									

3.5.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for the alkylated PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes.

3.5.4 Surrogate Compound Recoveries

Three surrogates, 2-fluorobiphenyl, nitrobenzene-*d*₅, and terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., alkylated PAHs), the surrogates reported should be adequate to monitor recovery in the analyses. Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. A few samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Using the guidance from the October 1999 National Functional Guidelines (since the current NFG do not effectively address surrogate compounds), only sample results where at least two surrogate compounds from each fraction (i.e., base/neutral fraction or acid fraction) fail to recover within limits are cause for qualification. Sample 112013327 recovered above the upper limit for two compounds, therefore detected target compounds will be qualified as estimated ("J").

The surrogate recoveries for all samples are presented in Table 3-35.

Table 3-35. Sediment Alkylated PAH by SIM Surrogate Results Summary

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Nitrobenzene- d_5		Terphenyl- d_{14}	
			Limits:	59	125	30	125	63
4087646001	102813264	1	63		68		70	
4087646007	102813282	1	80		85		85	
4087646012	102913291	1	69		69		74	
4087646016	102913300	1	81		87		88	
4087646019	102913308	1	74		76		80	
4087646023	102913317	1	87		96		95	
4087646025	102913327	1	80		89		97	
4087646031	102913349	1	82		90		91	
4088053001	110113375	1	67		73		70	
4088053005	110113386	1	59		67		62	S0
4088053009	110113393	1	62		69		65	
4088053015	110113410	1	62		68		70	
4088053020	110413432	1	58	S0	70		70	
4088053025	110413448	1	58	S0	70		64	
4088053031	110413461	1	55	S0	69		66	
4088053035	110413470	1	58	S0	62		67	
4088482001	110813001	1	60		65		63	
4088482005	110813019	1	58	S0	63		64	
4088482008	111113024	1	62		66		70	
4088482015	111213043	1	61		67		67	
4088486001	110813504	10	0	S4	0	S4	0	S4
4088486005	110813515	1	59		57		65	
4088622001	111313070	1	59		65		67	
4088622005	111313085	1	60		65		65	
4088622009	111313096	1	69		78		76	
4088622014	111413118	1	61		66		70	
4088622019	111413139	1	59		66		68	
4088622023	111413154	1	61		71		72	
4088879001	111513159	1	63		63		68	
4088879006	111513182	1	56	S0	85		85	
4088879009	111513187	1	62		98		73	
4088879013	111513199	1	65		77		70	
4088879016	111813210	1	67		82		84	
4088879021	111813223	1	67		76		91	
4088879024	111813235	1	58	S0	61		116	
4088879027	111813239	1	63		77		96	
4088879033	111913260	1	63		68		79	

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Nitrobenzene- d_5		Terphenyl- d_{14}	
4088879038	111913279	1	64		81		81	
4088879043	111913298	1	63		64		84	
4089023001	112013310	1	61		64		77	
4089023005	112013327	1	65		246	S5	152	S5
4089023007	112013331	1	65		69		70	
4089023013	112013346	5	62		68		70	
4089023018	112113366	5	65		88		73	
4089023024	112113385	5	67		66		75	
4089202001	112213406	1	64		55		71	
4089202007	112213425	1	67		54		74	
4089202013	112213447	1	68		56		70	
4089202017	112513452	1	67		60		71	
4089202020	112513466	10	71		82		77	
4089202024	112513473	1	64		56		67	
4089362001	112613490	1	66		56		68	
4089362004	112613503	1	68		87		76	
4089509001	120213522	1	64		57		69	
4089509006	120213545	1	58	S0	49		63	
4089509011	120213559	1	59		77		80	
4089509014	120313572	1	59		49		63	
4089509019	120313588	1	60		55		67	
4089509023	120313603	1	59		69		71	
4089665001	120413617	1	60		52		65	
4089665007	120413633	1	63		62		69	
4089665012	120413645	1	65		63		104	
4089818001	120613845	1	61		79		73	
4090340001	120613862	1	59		68		69	
4090340002	120913865	1	62		60		68	
4090340003	120913866	1	63		64		71	
4090340004	120913662	50	0	S4	0	S4	0	S4
4090340005	120913663	1	69		171	S0	93	
4090340006	120913664	1	58	S0	72		81	
4090340007	121013868	1	56	S0	46		65	
4090340008	121013869	1	75		69		101	
4090340009	121013519	1	90		93		120	
4090340010	121013520	1	56	S0	74		84	
4090340011	121113521	1	57	S0	44		68	
4090340012	121113522	1	60		70		71	
4090340013	121113523	1	56	S0	45		68	

3.5.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on multiple samples.

Most of the analytes gave failing recoveries for the matrix spiked sample and/or the matrix spiked duplicate sample. Consequently, many of the RPD values exceeded the laboratory limits for the reported analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data. Most failures are attributed to samples dilution. No results will be qualified based on MS/MSD recovery.

The matrix spike/matrix spike duplicate results are summarized in Table 3-36.

3.5.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples.

All of the analytes for all of the laboratory control samples recovered within the limits used by the laboratory. No data are qualified based upon laboratory control sample results. The laboratory control sample results are given in Table 3-37.

3.5.7 Field Duplicates

No project specific field duplicates were analyzed with this data set.

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 102813264

Parameter	MS Sample ID: 102813264			MSD Sample ID: 102813264			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	74.3	344	143	74.3	404	223	16	238 M1, N2	30
Acenaphthene	74.3	805	449	74.3	972	672	19	472 M1	30
Acenaphthylene	74.3	651	74	74.3	530	-88	21	595 M1	30
Anthracene	74.3	1990	684	74.3	2410	1240	19	1480 M1	30
Benzo(a)anthracene	74.3	4240	1330	74.3	4730	1990	11	3250 M1	30
Benzo(a)pyrene	74.3	4490	1390	74.3	4570	1500	2	3460 M1	30
Benzo(a,b)fluoranthene	89.3	4550	1460	89.3	5010	1970	10	3250 M1, N2	30
Benzo(e)pyrene	74.3	3030	928	74.3	3070	982	1	2340 M1, N2	30
Benzo(g,h,i)perylene	74.3	2460	843	74.3	2250	565	9	1830 M1	30
Benzo(k)fluoranthene	74.3	3720	1570	74.3	3600	1420	3	2550 M1	30
Chrysene	74.3	4990	845	74.3	5420	1430	8	4360 M1	30
Dibenz(a,h)anthracene	74.3	725	213	74.3	745	240	3	566 M1	30
Fluoranthene	74.3	12200	4400	74.3	13300	5920	9	8890 M1	30
Fluorene	74.3	974	485	74.3	1150	725	17	613 M1	30
Indeno(1,2,3-cd)pyrene	74.3	2540	892	74.3	2390	685	6	1880 M1	30
Naphthalene	74.3	382	194	74.3	475	319	22	238 M1, N2	30
Perylene	74.3	1230	472	74.3	1230	462	0.6	883 M1, N2	30
Phenanthrene	74.3	8250	3740	74.3	9960	6030	19	5470 M1	30
Pyrene	74.3	8350	1700	74.3	9310	3000	11	7080 M1	30

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 110113375

Parameter	MS Sample ID: 110113375			MSD Sample ID: 110113375			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	74	270	-46	74	300	-6	11	304 M1, N2	30
Acenaphthene	74	243	-25	74	311	67	25	261 M1	30
Acenaphthylene	74	448	-94	74	688	230	42	517 M1, R1	30
Anthracene	74	661	-261	74	999	195	41	854 M1, R1	30
Benzo(a)anthracene	74	1380	-832	74	1980	-21	36	1990 M1, R1	30
Benzo(a)pyrene	74	1500	-1010	74	2220	-38	39	2240 M1, R1	30
Benzo(a,b)fluoranthene	88.9	1730	-885	88.9	2530	14	38	2510 M1, N2, R1	30
Benzo(e)pyrene	74	1130	-651	74	1620	12	36	1610 M1, N2, R1	30
Benzo(g,h,i)perylene	74	624	-791	74	954	-344	42	1210 M1, R1	30
Benzo(k)fluoranthene	74	1270	-509	74	1720	100	30	1650 M1	30
Chrysene	74	1740	-1040	74	2450	-74	34	2510 M1, R1	30
Dibenz(a,h)anthracene	74	259	-163	74	389	14	40	379 M1, R1	30
Fluoranthene	74	3470	-1970	74	5060	172	37	4930 M1, R1	30
Fluorene	74	324	-63	74	415	60	25	370 M1	30
Indeno(1,2,3-cd)pyrene	74	671	-709	74	986	-282	38	1200 M1, R1	30
Naphthalene	74	124	-.3	74	134	14	8	124 M1, N2	30
Perylene	74	396	-170	74	552	41	33	521 M1, N2, R1	30
Phenanthrene	74	1840	-1190	74	2610	-158	34	2730 M1, R1	30
Pyrene	74	2810	-1760	74	4040	-98	36	4110 M1, R1	30

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 111213043

Parameter	MS Sample ID: 111213043			MSD Sample ID: 111213043			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	98.3	103 J	83	98.3	107	87		20.9 JN2	30
Acenaphthene	98.3	120 J	80	98.3	117	77		41.0 J	30
Acenaphthylene	98.3	199	98	98.3	179	77	11	103 J	30
Anthracene	98.3	267	104	98.3	234	71	13	165	30
Benzo(a)anthracene	98.3	675	160	98.3	543	26	22	517 M1	30
Benzo(a)pyrene	98.3	912	220	98.3	728	33	22	696 M1	30
Benzo(a,b)fluoranthene	118	1080	177	118	899	26	18	869 M1, N2	30
Benzo(e)pyrene	98.3	744	181	98.3	610	45	20	566 M1, N2	30
Benzo(g,h,i)perylene	98.3	505	77	98.3	386	-44	27	430 M1	30
Benzo(k)fluoranthene	98.3	779	158	98.3	700	78	11	623 M1	30
Chrysene	98.3	916	180	98.3	747	8	20	739 M1	30
Dibenz(a,h)anthracene	98.3	199	76	98.3	162	39	20	124 J	30
Fluoranthene	98.3	1660	360	98.3	1300	-3	24	1300 M1	30
Fluorene	98.3	136 J	85	98.3	124	72		52.7 J	30
Indeno(1,2,3-cd)pyrene	98.3	532	101	98.3	414	-19	25	432 M1	30
Naphthalene	98.3	94.5 J	76	98.3	92.5	74		19.5 JN2	30
Perylene	98.3	290	115	98.3	252	76	14	177 N2	30
Phenanthrene	98.3	605	129	98.3	510	33	17	477	30
Pyrene	98.3	1290	239	98.3	1090	30	17	1060 M1	30

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 112013331

Parameter	MS Sample ID: 112013331			MSD Sample ID: 112013331			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	65.9	228	201	65.9	370	415	47	95.4 JH2, M1, N2,	30
Acenaphthene	65.9	599	401	65.9	2180	2790	114	334 H2, M1, R1	30
Acenaphthylene	65.9	343	108	65.9	643	561	61	272 H2, M1, R1	30
Anthracene	65.9	1440	1500	65.9	5140	7080	112	457 H2, M1, R1	30
Benzo(a)anthracene	65.9	2450	2090	65.9	8370	11000	109	1070 H2, M1, R1	30
Benzo(a)pyrene	65.9	2400	1780	65.9	7010	8740	98	1230 H2, M1, R1	30
Benzo(a,b)fluoranthene	79.2	3290	1980	79.2	10600	11200	105	1720 H2, M1, N2,	30
Benzo(e)pyrene	65.9	1610	1110	65.9	4760	5860	99	876 H2, M1, N2,	30
Benzo(g,h,i)perylene	65.9	1180	714	65.9	3390	4060	97	706 H2, M1, R1	30
Benzo(k)fluoranthene	65.9	1250	981	65.9	3610	4560	97	599 H2, M1, R1	30
Chrysene	65.9	2650	2000	65.9	8290	10500	103	1340 H2, M1, R1	30
Dibenz(a,h)anthracene	65.9	387	305	65.9	1070	1340	94	186 H2, M1, R1	30
Fluoranthene	65.9	5550	4580	65.9	16600	21300	100	2530 H2, M1, R1	30
Fluorene	65.9	768	684	65.9	2440	3200	104	316 H2, M1, R1	30
Indeno(1,2,3-cd)pyrene	65.9	1090	749	65.9	3220	3970	99	596 H2, M1, R1	30
Naphthalene	65.9	162	158	65.9	202	218	22	58.0 JH2, M1, N2	30
Perylene	65.9	645	521	65.9	2130	2760	107	302 H2, M1, N2,	30
Phenanthrene	65.9	4320	4050	65.9	13100	17400	101	1650 H2, M1, R1	30
Pyrene	65.9	4580	3630	65.9	15600	20200	109	2180 H2, M1, R1	30

Table 3-36. Sediment Alkylated PAH by SIM MS/MSD Results Summary 092413813

Parameter	MS Sample ID: 121013868			MSD Sample ID: 121013868			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	41.5	195	253	41.5	154	155	23	89.9 M1, N2	30
Acenaphthene	41.5	161	263	41.5	126	179	24	51.8 JM1	30
Acenaphthylene	41.5	77.2	148	41.5	77.7	149	0.7	15.6 J	30
Anthracene	41.5	135	228	41.5	131	218	3	40.7 JM1	30
Benzo(a)anthracene	41.5	111	191	41.5	114	198	3	31.8 JM1	30
Benzo(a)pyrene	41.5	112	194	41.5	116	203	3	31.3 JM1	30
Benzo(a,b)fluoranthene	49.8	110	159	49.8	119	176	8	31.1 JM1, N2	30
Benzo(e)pyrene	41.5	80.0	147	41.5	85	159	6	18.8 JM1, N2	30
Benzo(g,h,i)perylene	41.5	45.6 J	76	41.5	48.4	82		14.1 J	30
Benzo(k)fluoranthene	41.5	67.4	136	41.5	64.3	128	5	10.8 J	30
Chrysene	41.5	113	187	41.5	121	206	7	34.9 JM1	30
Dibenz(a,h)anthracene	41.5	30.4 J	65	41.5	30.5	65		3.5 J	30
Fluoranthene	41.5	182	298	41.5	187	309	3	58.3 JM1	30
Fluorene	41.5	104	185	41.5	91.7	156	12	26.7 JM1	30
Indeno(1,2,3-cd)pyrene	41.5	42.2 J	77	41.5	43.6	80		10.2 J	30
Naphthalene	41.5	200	207	41.5	175	145	14	114 M1, N2	30
Perylene	41.5	50.9 J	109	41.5	51.5	110		12.5 UN2	30
Phenanthrene	41.5	318	483	41.5	289	411	10	118 M1	30
Pyrene	41.5	241	378	41.5	241	379	0.3	83.5 M1	30

Table 3-37. Sediment Alkylated PAH by SIM LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 276509			QC Batch: 277680			QC Batch: 278046		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	41	125	33.3	28.1	84	33.3	26.3	79	33.3	28.0	84
Acenaphthene	41	125	33.3	24.4	73	33.3	24.0	72	33.3	25.7	77
Acenaphthylene	43	125	33.3	26.1	78	33.3	26.3	79	33.3	28.4	85
Anthracene	39	142	33.3	27.6	83	33.3	26.6	80	33.3	27.6	83
Benzo(a)anthracene	48	131	33.3	27.2	82	33.3	27.2	82	33.3	28.3	85
Benzo(a)pyrene	52	125	33.3	28.6	86	33.3	28.9	87	33.3	29.4	88
Benzo(a,b)fluoranthene	41	150	40	32.4	81	40	30.9	77	40	34.8	87
Benzo(e)pyrene	47	138	33.3	26.2	78	33.3	25.6	77	33.3	27.2	82
Benzo(g,h,i)perylene	46	132	33.3	27.3	82	33.3	27.4	82	33.3	27.8	83
Benzo(k)fluoranthene	49	139	33.3	27.2	82	33.3	27.1	81	33.3	31.7	95
Chrysene	70	130	33.3	26.2	79	33.3	26.0	78	33.3	27.0	81
Dibenz(a,h)anthracene	46	143	33.3	28.3	85	33.3	28.4	85	33.3	28.4	85
Fluoranthene	47	146	33.3	28.6	86	33.3	27.8	83	33.3	30.8	93
Fluorene	38	135	33.3	25.3	76	33.3	24.4	73	33.3	27.2	82
Indeno(1,2,3-cd)pyrene	48	136	33.3	27.3	82	33.3	26.9	81	33.3	27.2	81
Naphthalene	38	125	33.3	24.1	72	33.3	23.1	69	33.3	25.0	75
Perylene	33	125	33.3	30.9	93	33.3	30.6	92	33.3	31.4	94
Phenanthrene	40	136	33.3	24.9	75	33.3	23.9	72	33.3	25.4	76
Pyrene	50	137	33.3	28.8	86	33.3	27.5	83	33.3	30.5	91

Table 3-37. Sediment Alkylated PAH by SIM LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 278384			QC Batch: 279425			QC Batch: 279577		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	41	125	33.3	27.5	82	33.3	26.7	80	33.3	27.5	82
Acenaphthene	41	125	33.3	25.2	76	33.3	24.1	72	33.3	24.9	75
Acenaphthylene	43	125	33.3	26.8	81	33.3	24.6	74	33.3	25.4	76
Anthracene	39	142	33.3	28.4	85	33.3	26.0	78	33.3	26.0	78
Benzo(a)anthracene	48	131	33.3	27.7	83	33.3	25.8	77	33.3	25.5	76
Benzo(a)pyrene	52	125	33.3	29.2	88	33.3	27.5	82	33.3	26.7	80
Benzo(a,b)fluoranthene	41	150	40	32.2	80	40	30.7	77	40	30.7	77
Benzo(e)pyrene	47	138	33.3	26.4	79	33.3	25.4	76	33.3	24.8	74
Benzo(g,h,i)perylene	46	132	33.3	26.2	79	33.3	23.2	70	33.3	21.9	66
Benzo(k)fluoranthene	49	139	33.3	26.9	81	33.3	26.7	80	33.3	25.7	77
Chrysene	70	130	33.3	26.2	79	33.3	26.1	78	33.3	25.5	77
Dibenz(a,h)anthracene	46	143	33.3	27.0	81	33.3	23.7	71	33.3	22.3	67
Fluoranthene	47	146	33.3	28.5	85	33.3	26.8	80	33.3	26.3	79
Fluorene	38	135	33.3	25.2	76	33.3	24.8	75	33.3	25.8	77
Indeno(1,2,3-cd)pyrene	48	136	33.3	25.3	76	33.3	23.5	70	33.3	22.3	67
Naphthalene	38	125	33.3	23.9	72	33.3	24.2	73	33.3	24.4	73
Perylene	33	125	33.3	31.8	96	33.3	31.0	93	33.3	29.7	89
Phenanthrene	40	136	33.3	25.8	77	33.3	25.1	75	33.3	25.2	75
Pyrene	50	137	33.3	27.6	83	33.3	27.9	84	33.3	27.6	83

Table 3-37. Sediment Alkylated PAH by SIM LCS Results Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 280237			QC Batch: 280539			QC Batch: 281203			QC Batch: 282377		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	41	125	33.3	24.2	73	33.3	23.2	70	33.3	28.3	85	33.3	28.6	86
Acenaphthene	41	125	33.3	22.9	69	33.3	21.5	65	33.3	25.6	77	33.3	25.2	76
Acenaphthylene	43	125	33.3	23.3	70	33.3	22.1	66	33.3	26.7	80	33.3	26.1	78
Anthracene	39	142	33.3	25.7	77	33.3	24.2	73	33.3	27.0	81	33.3	26.8	81
Benzo(a)anthracene	48	131	33.3	26.4	79	33.3	25.6	77	33.3	26.0	78	33.3	26.1	78
Benzo(a)pyrene	52	125	33.3	27.3	82	33.3	26.1	78	33.3	27.2	82	33.3	26.7	80
Benzo(a,b)fluoranthene	41	150	40	32.5	81	40	30.6	76	40	32.7	82	40	29.7	74
Benzo(e)pyrene	47	138	33.3	28.4	85	33.3	27.4	82	33.3	28.6	86	33.3	27.1	81
Benzo(g,h,i)perylene	46	132	33.3	23.1	69	33.3	22.6	68	33.3	23.5	70	33.3	22.8	68
Benzo(k)fluoranthene	49	139	33.3	27.1	81	33.3	25.7	77	33.3	27.1	81	33.3	25.0	75
Chrysene	70	130	33.3	27.0	81	33.3	25.9	78	33.3	26.7	80	33.3	26.3	79
Dibenz(a,h)anthracene	46	143	33.3	23.8	71	33.3	23.1	69	33.3	24.0	72	33.3	22.4	67
Fluoranthene	47	146	33.3	27.8	83	33.3	26.8	80	33.3	27.9	84	33.3	27.0	81
Fluorene	38	135	33.3	25.2	76	33.3	23.6	71	33.3	27.2	81	33.3	26.2	78
Indeno(1,2,3-cd)pyrene	48	136	33.3	23.9	72	33.3	23.3	70	33.3	24.2	73	33.3	23.0	69
Naphthalene	38	125	33.3	22.0	66	33.3	21.1	63	33.3	25.9	78	33.3	26.4	79
Perylene	33	125	33.3	27.3	82	33.3	27.1	81	33.3	28.3	85	33.3	28.3	85
Phenanthrene	40	136	33.3	25.3	76	33.3	24.0	72	33.3	26.3	79	33.3	26.0	78
Pyrene	50	137	33.3	28.7	86	33.3	27.6	83	33.3	28.3	85	33.3	28.9	87

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1.0 INTRODUCTION

All data validation was performed by Shepherd Technical Services following US EPA National Functional Guidelines (NFG), where applicable, using electronic deliverables. Guidance and requirements appearing in the NRT Multi-Site Quality Assurance Project Plan, Rev. 2, 2007 ("Multi-Site QAPP") were also used in the validation process.

Pace Analytical Services, Inc., Green Bay, WI performed the sample analyses on the sediment samples. The Pace Green Bay laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200050). The Pace laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Florida Department of Health Environmental Laboratory Certification Program (ID #E87948).

Pace Analytical Services, Inc., Minneapolis, MN also performed the sample analyses on the sediment samples. The Pace Minneapolis laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200011). The Pace Minneapolis laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Minnesota Department of Health, Environmental Laboratory Accreditation Program (ID # 027-053-137).

Pace Analytical Services, Inc., Indianapolis, IN also performed the sample analyses on the sediment samples. The Pace Indianapolis laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200074). The Pace Indianapolis laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Louisiana Department of Environmental Quality's Environmental Laboratory Accreditation Program (ID # 04076).

TestAmerica Burlington performed analyses for total organic carbon (TOC) and black carbon. The Burlington facility also performed additional analyses for the equipment blanks. The TestAmerica Burlington laboratory holds primary accreditation under the National Environmental Laboratory Accreditation Program (NELAP) by the New Jersey Department of Environmental Protection (ID # VT972).

The laboratories provided all analytical data, including all internal laboratory QC results in an electronic deliverable format.

A total of 341 total sediment samples and 39 aqueous samples (trip blanks, field blanks, equipment blanks, etc.) were collected August 26, 2013 to October 3, 2013 at the North Branch Division Street sites. Upon collection, all samples were held securely prior to shipping to the laboratory. Samples were organized into 36 sample

delivery groups (SDGs, or laboratory lot numbers). Samples were analyzed for the indicated parameters using the methods listed in Table 1-1.

The following discrepancies were noted by PACE at sample login;

- Samples 091213499 and 091213500 were matched using the sample IDs recorded on the lid, since the label on the side of the container had a different sample point indicated.
- Sample 091713590 was marked for MS/MSD, however, there was not enough sample received to prepare and analyze MS/MSDs.
- No 40 mL VOA vial was received for Sample 091813637, consequently sample was taken from an unpreserved container.
- COC form for sample 100213212 listed the field ID as 100213211 while the container label showed 100213212. The sample was logged in as per the container label.

Table 1-1. Sample/SDG Cross Reference

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
082613001	200-18170-1			X	X			X	X	X	X		
082613002	200-18170-3		X									X	X
	4083785001	X	X	X		X		X	X		X		
082613003	200-18170-4		X										X
	4083785002		X	X		X		X	X	X	X		
082613004	200-18170-5		X										X
	4083785003		X	X		X		X	X	X	X		
082613015	200-18170-6		X									X	X
	4083785004	X	X	X		X		X	X		X		
082613016	200-18170-7		X										X
	4083785005		X	X		X		X	X	X	X		
082613017	200-18170-8		X										X
	4083785006		X	X		X		X	X	X	X		
082613018	200-18170-9		X										X
	4083785007		X	X		X		X	X	X	X		
82713023	200-18170-24		X										X
	4083785008		X	X		X		X	X	X	X		
082713024	200-18170-2			X	X			X	X	X	X		
082713025	200-18170-10		X									X	X
	4083785009		X	X		X		X	X	X	X		
082713026	200-18170-11		X										X
	4083785010		X	X		X		X	X	X	X		
082713027	200-18170-12		X										X
	4083785011		X	X		X		X	X	X	X		
082713043	200-18170-13		X									X	X
	4083785012		X	X		X		X	X	X	X		
082713044	200-18170-14		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4083785013		X	X		X		X	X	X	X		
082713045	200-18170-15		X										X
	4083785014		X	X		X		X	X	X	X		
082713048	200-18170-16		X										X
	4083785015		X	X		X		X	X	X	X		
082713050	4083785016	X											
082713051	4083785017	X											
082713052	200-18170-17		X									X	X
	4083785018	X	X	X		X		X	X		X		
082713053	200-18170-18		X										X
	4083785019		X	X		X		X	X	X	X		
082713054	200-18170-19		X										X
	4083785020		X	X		X		X	X	X	X		
082713073	200-18170-20		X									X	X
	4083785021		X	X		X		X	X	X	X		
082713074	200-18170-21		X										X
	4083785022		X	X		X		X	X	X	X		
082713075	200-18170-22		X										X
	4083785023		X	X		X		X	X	X	X		
082713076	200-18170-23		X										X
	4083785024		X	X		X		X	X	X	X		
082713081	4083785025	X											
082813083	200-18273-19			X	X			X	X	X	X		
082813084	200-18273-1		X									X	X
	4083977001	X	X	X		X		X	X		X		
082813085	200-18273-2		X										X
	4083977002		X	X		X		X	X	X	X		
082813086	200-18273-3		X										X
	4083977003		X	X		X		X	X	X	X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
082813096	200-18273-4		X										X
	4083977004		X	X		X		X	X	X	X		
082813097	200-18273-5		X										X
	4083977005		X	X		X		X	X	X	X		
082813098	200-18273-6		X									X	X
	4083977006		X	X		X		X	X	X	X		
082813099	200-18273-7		X										X
	4083977007		X	X		X		X	X	X	X		
082813105	4083977008	X											
082813106	200-18273-8		X										X
	4083977009		X	X		X		X	X	X	X		
082813107	200-18273-9		X									X	X
	4083977010	X	X	X		X		X	X		X		
082813108	200-18273-10		X										X
	4083977011		X	X		X		X	X	X	X		
082813109	200-18273-11		X										X
	4083977012		X	X		X		X	X	X	X		
082913126	200-18273-20			X	X			X	X	X	X		
082913127	200-18273-12		X									X	X
	4083977013	X	X	X		X		X	X		X		
082913128	200-18273-13		X										X
	4083977014		X	X		X		X	X	X	X		
082913129	200-18273-14		X										X
	4083977015		X	X		X		X	X	X	X		
082913140	200-18273-15		X										X
	4083977016		X	X		X		X	X	X	X		
082913141	200-18273-16		X										X
	4083977017		X	X		X		X	X	X	X		
082913142	200-18273-17		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4083977018		X	X		X		X	X	X	X		
082913147	200-18273-18		X										X
	4083977019		X	X		X		X	X	X	X		
083013148	200-18273-21							X					
083013149	200-18312-15			X	X			X	X	X	X		
083013150	200-18312-1		X									X	X
	4084169001	X	X	X		X		X	X		X		
083013151	200-18312-2		X										X
	4084169002		X	X		X		X	X	X	X		
083013152	200-18312-3		X										X
	4084169003		X	X		X		X	X	X	X		
083013159	200-18312-4		X										X
	4084169004		X	X		X		X	X	X	X		
083013167	200-18312-5		X									X	X
	4084169005	X	X	X		X		X	X		X		
083013168	200-18312-6		X										X
	4084169006		X	X		X		X	X	X	X		
083013169	200-18312-7		X										X
	4084169007		X	X		X		X	X	X	X		
083013175	200-18312-8		X										X
	4084169008		X	X		X		X	X	X	X		
090313180	200-18312-16			X	X			X	X	X	X		
090313181	200-18312-17							X					
090313182	200-18312-9		X									X	X
	4084169009	X	X	X		X		X	X		X		
090313183	200-18312-10		X										X
	4084169010		X	X		X		X	X	X	X		
090313184	200-18312-11		X										X
	4084169011		X	X		X		X	X	X	X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
090313201	200-18312-12		X									X	X
	4084169012	X	X	X		X		X	X		X		
090313204	200-18312-13		X										X
	4084169013		X	X		X		X	X	X	X		
090313209	200-18312-14		X										X
	4084168001		X	X									
090413210	200-18336-1			X	X			X	X	X	X		
090413211	200-18336-2							X					
090513233	200-18336-3			X	X			X	X	X	X		
090513234	200-18336-4		X									X	X
	4084310001	X	X	X		X		X	X		X		
090513235	200-18336-5		X										X
	4084310002		X	X		X		X	X	X	X		
090513236	200-18336-6		X										X
	4084310003		X	X		X		X	X	X	X		
090513241	200-18336-7		X										X
	4084310004		X	X		X		X	X	X	X		
090513242	200-18336-8		X										X
	4084310005		X	X		X		X	X	X	X		
090513243	200-18336-9		X									X	X
	4084310006	X	X	X		X		X	X		X		
090513250	200-18336-10		X										X
	4084310007		X	X		X		X	X	X	X		
090513251	200-18336-11		X										X
	4084310008		X	X		X		X	X	X	X		
090513252	200-18336-12		X									X	X
	4084310009	X	X	X		X		X	X		X		
090513253	200-18336-13		X										X
	4084310010		X	X		X		X	X	X	X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
090513254	200-18336-14		X										X
	4084310011		X	X		X		X	X	X	X		
090513257	200-18336-15		X										X
	4084310012		X	X		X		X	X	X	X		
090513265	200-18336-16		X										X
	4084310013		X	X		X		X	X	X	X		
090513269	200-18336-17		X									X	X
	4084310014	X	X	X		X		X	X		X		
090513270	200-18336-18		X										X
	4084310015		X	X		X		X	X	X	X		
090513271	200-18336-19		X										X
	4084310016		X	X		X		X	X	X	X		
090513274	200-18336-20		X									X	X
	4084310017	X	X	X		X		X	X		X		
090513281	200-18336-21		X										X
	4084310018		X	X		X		X	X	X	X		
090613282	200-18393-1			X	X			X	X	X	X		
090613283	200-18393-5		X									X	X
	4084566001	X	X	X		X		X	X		X		
090613284	200-18393-6		X										X
	4084566002		X	X		X		X	X	X	X		
090613285	200-18393-7		X										X
	4084566003		X	X		X		X	X	X	X		
090613292	200-18393-8		X										X
	4084566004		X	X		X		X	X	X	X		
090613293	200-18393-9		X										X
	4084566005		X	X		X		X	X	X	X		
090613294	200-18393-10		X										X
	4084566006		X	X		X		X	X	X	X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
090613296	200-18393-2							X					
090613297	200-18393-11		X									X	X
	4084566007	X	X	X		X		X	X		X		
090613298	200-18393-12		X										X
	4084566008		X	X		X		X	X	X	X		
090613299	200-18393-13		X										X
	4084566009		X	X		X		X	X	X	X		
090613310	200-18393-14		X										X
	4084566010		X	X		X		X	X	X	X		
090613311	200-18393-15		X									X	X
	4084566011	X	X	X		X		X	X		X		
090613312	200-18393-16		X										X
	4084566012		X	X		X		X	X	X	X		
090613313	200-18393-17		X										X
	4084566013		X	X		X		X	X	X	X		
090613318	200-18393-18		X										X
	4084566014		X	X		X		X	X	X	X		
090613319	200-18393-19		X										X
	4084566015		X	X		X		X	X	X	X		
090913322	200-18393-3			X	X			X	X	X	X		
090913323	200-18393-20		X									X	X
	4084566016	X	X	X		X		X	X		X		
090913324	200-18393-21		X										X
	4084566017		X	X		X		X	X	X	X		
090913325	200-18393-22		X										X
	4084566018		X	X		X		X	X	X	X		
090913332	200-18393-23		X										X
	4084566019		X	X		X		X	X	X	X		
090913333	200-18393-24		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4084566020		X	X		X		X	X	X	X		
090913334	200-18393-25		X										X
	4084566021		X	X		X		X	X	X	X		
090913335	200-18393-26		X									X	X
	4084566022	X	X	X		X		X	X		X		
090913336	200-18393-27		X										X
	4084566023		X	X		X		X	X	X	X		
090913337	200-18393-28		X										X
	4084566024		X	X		X		X	X	X	X		
090913344	200-18393-29		X										X
	4084566025		X	X		X		X	X	X	X		
090913345	200-18393-30		X										X
	4084566026		X	X		X		X	X	X	X		
090913346	200-18393-31		X									X	X
	4084566027	X	X	X		X		X	X		X		
090913347	200-18393-32		X										X
	4084566028		X	X		X		X	X	X	X		
090913348	200-18393-33		X										X
	4084566029		X	X		X		X	X	X	X		
090913357	200-18393-34		X									X	X
	4084566030	X	X	X		X		X	X		X		
090913358	200-18393-35		X										X
	4084566031		X	X		X		X	X	X	X		
090913359	200-18393-36		X										X
	4084566032		X	X		X		X	X	X	X		
090913361	200-18393-37		X									X	X
	4084566033	X	X	X		X		X	X		X		
090913362	200-18393-38		X										X
	4084566034		X	X		X		X	X	X	X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
090913363	200-18393-39		X										X
	4084566035		X	X		X		X	X	X	X		
091013372	200-18393-4			X	X			X	X	X	X		
091013373	200-18393-40		X									X	X
	4084566036	X	X	X		X		X	X		X		
091013374	200-18393-41		X										X
	4084566037		X	X		X		X	X	X	X		
091013375	200-18393-42		X										X
	4084566038		X	X		X		X	X	X	X		
091013395	200-18393-43		X										X
	4084566039		X	X		X		X	X	X	X		
091013396	200-18393-44		X										X
	4084566040		X	X		X		X	X	X	X		
091013397	200-18393-45		X										X
	4084566041		X	X		X		X	X	X	X		
091013398	200-18393-46		X									X	X
	4084566042		X	X		X		X	X	X	X		
091013399	200-18393-47		X										X
	4084566043	X	X	X		X		X	X		X		
091013400	200-18393-48		X										X
	4084566044		X	X		X		X	X	X	X		
091013418	200-18393-49		X										X
	4084566045		X	X		X		X	X	X	X		
091013419	200-18393-50		X										X
	4084566046		X	X		X		X	X	X	X		
091013421	200-18393-51		X										X
	4084566047		X	X		X		X	X	X	X		
091113422	200-18438-1			X	X			X	X	X	X		
091113423	200-18438-2							X					

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
091113424	200-18438-4		X									X	X
	4084784001	X	X	X		X		X	X		X		
091113425	200-18438-5		X										X
	4084784002		X	X		X		X	X	X	X		
091113426	200-18438-6		X										X
	4084784003		X	X		X		X	X	X	X		
091113430	200-18438-7		X									X	X
	4084784004	X	X	X		X		X	X		X		
091113431	200-18438-8		X										X
	4084784005		X	X		X		X	X	X	X		
091113432	200-18438-9		X										X
	4084784006		X	X		X		X	X	X	X		
091113437	200-18438-10		X									X	X
	4084784007	X	X	X		X		X	X		X		
091113438	200-18438-11		X										X
	4084784008		X	X		X		X	X	X	X		
091113439	200-18438-12		X										X
	4084784009		X	X		X		X	X	X	X		
091113450	200-18438-13		X									X	X
	4084784010	X	X	X		X		X	X		X		
091113451	200-18438-14		X										X
	4084784011		X	X		X		X	X	X	X		
091113452	200-18438-15		X										X
	4084784012		X	X		X		X	X	X	X		
091113460	200-18438-16		X										X
	4084784013		X	X		X		X	X	X	X		
091113461	200-18438-17		X									X	X
	4084784014	X	X	X		X		X	X		X		
091113462	200-18438-18		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4084784015		X	X		X		X	X	X	X		
091113463	200-18438-19		X										X
	4084784016		X	X		X		X	X	X	X		
091113466	200-18438-20		X										X
	4084784017		X	X		X		X	X	X	X		
091113467	200-18438-21		X										X
	4084784018		X	X		X		X	X	X	X		
091113468	200-18438-22		X										X
	4084784019		X	X		X		X	X	X	X		
091213472	200-18438-3			X	X			X	X	X	X		
091213473	200-18438-23		X									X	X
	4084784020	X	X	X		X		X	X		X		
091213474	200-18438-24		X										X
	4084784021		X	X		X		X	X	X	X		
091213475	200-18438-25		X										X
	4084784022		X	X		X		X	X	X	X		
091213486	200-18438-26		X										X
	4084784023		X	X		X		X	X	X	X		
091213487	200-18438-27		X									X	X
	4084784024	X	X	X		X		X	X		X		
091213488	200-18438-28		X										X
	4084784025		X	X		X		X	X	X	X		
091213489	200-18438-29		X										X
	4084784026		X	X		X		X	X	X	X		
091213495	200-18438-30		X									X	X
	4084784027	X	X	X		X		X	X		X		
091213496	200-18438-31		X										X
	4084784028		X	X		X		X	X	X	X		
091213497	200-18438-32		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4084784029		X	X		X		X	X	X	X		
091213498	200-18438-33		X									X	X
	4084784030	X	X	X		X		X	X		X		
091213499	200-18438-34		X										X
	4084784031		X	X		X		X	X	X	X		
091213500	200-18438-35		X										X
	4084784032		X	X		X		X	X	X	X		
091213509	200-18438-36		X									X	X
	4084784033	X	X	X		X		X	X		X		
091213510	200-18438-37		X										X
	4084784034		X	X		X		X	X	X	X		
091213511	200-18438-38		X										X
	4084784035		X	X		X		X	X	X	X		
091213518	200-18438-39		X										X
	4084784036		X	X		X		X	X	X	X		
091213519	200-18438-40		X										X
	4084784037		X	X		X		X	X	X	X		
091213520	200-18438-41		X										X
	4084784038		X	X		X		X	X	X	X		
091313524	200-18503-1			X	X			X	X	X	X		
091313525	200-18503-2							X					
091613539	200-18503-3			X	X			X	X	X	X		
091613545	200-18503-5		X										X
	4085044001		X	X		X		X	X	X	X		
091613548	200-18503-6		X										X
	4085044002		X	X		X		X	X	X	X		
091613553	200-18503-7		X									X	X
	4085044003	X	X	X		X		X	X		X		
091613554	200-18503-8		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4085044004		X	X		X		X	X	X	X		
091613555	200-18503-9		X										X
	4085044005		X	X		X		X	X	X	X		
091613564	200-18503-10		X									X	X
	4085044006	X	X	X		X		X	X		X		
091613565	200-18503-11		X										X
	4085044007		X	X		X		X	X	X	X		
091613566	200-18503-12		X										X
	4085044008		X	X		X		X	X	X	X		
091713568	200-18503-4			X	X			X	X	X	X		
091713569	200-18503-13		X									X	X
	4085044009	X	X	X		X		X	X		X		
091713570	200-18503-14		X										X
	4085044010		X	X		X		X	X	X	X		
091713571	200-18503-15		X										X
	4085044011		X	X		X		X	X	X	X		
091713587	200-18503-16		X										X
	4085044012		X	X		X		X	X	X	X		
091713588	200-18503-21		X										X
	4085044017		X	X		X		X	X	X	X		
091713590	200-18503-17		X										X
	4085044013		X	X		X		X	X	X	X		
091713591	200-18503-18		X										X
	4085044014		X	X		X		X	X	X	X		
091713592	200-18503-19		X										X
	4085044015		X	X		X		X	X	X	X		
091713594	200-18503-20		X										X
	4085044016		X	X		X		X	X	X	X		
091713595	200-18503-22		X									X	X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4085044018		X	X		X		X	X	X	X		
091713596	200-18503-23		X										X
	4085044019		X	X		X		X	X	X	X		
091713597	200-18503-24		X										X
	4085044020		X	X		X		X	X	X	X		
091713609	200-18503-25		X										X
	4085044021		X	X		X		X	X	X	X		
091713611	200-18503-26		X										X
	4085044022		X	X		X		X	X	X	X		
091713612	200-18503-27		X										X
	4085044023		X	X		X		X	X	X	X		
091713613	200-18503-28		X										X
	4085044024		X	X		X		X	X	X	X		
091713614	4085044025	X	X										
091713615	200-18503-29		X									X	X
	4085044026	X	X	X		X		X	X		X		
091713616	200-18503-30		X										X
	4085044027		X	X		X		X	X	X	X		
091713617	200-18503-31		X										X
	4085044028		X	X		X		X	X	X	X		
091713629	200-18503-32		X										X
	4085044029		X	X		X		X	X	X	X		
091713630	200-18503-33		X										X
	4085044030		X	X		X		X	X	X	X		
091713631	200-18503-34		X										X
	4085044031		X	X		X		X	X	X	X		
091813636	200-18545-1			X	X			X	X	X	X		
091813637	200-18545-4		X									X	X
	4085230001		X	X		X		X		X	X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
091813638	200-18545-5		X										X
	4085230002		X	X		X		X		X	X		
091813639	200-18545-6		X										X
	4085230003		X	X		X		X		X	X		
091813649	200-18545-7		X										X
	4085230004		X	X		X		X		X	X		
091813650	200-18545-8		X										X
	4085230005		X	X		X		X		X	X		
091813651	200-18545-9		X										X
	4085230006		X	X		X		X		X	X		
091813654	4085230007	X	X										
091813655	200-18545-10		X									X	X
	4085230008	X	X	X		X		X			X		
091813656	200-18545-11		X										X
	4085230009		X	X		X		X		X	X		
091813657	200-18545-12		X										X
	4085230010		X	X		X		X		X	X		
091813671	200-18545-13		X										X
	4085230011		X	X		X		X		X	X		
091813672	200-18545-14		X										X
	4085230012		X	X		X		X		X	X		
091813673	200-18545-15		X										X
	4085230013		X	X		X		X		X	X		
091813674	200-18545-16		X										X
	4085230014		X	X		X		X		X	X		
091813675	200-18545-17		X									X	X
	4085230015	X	X	X		X		X			X		
091813676	200-18545-18		X										X
	4085230016		X	X		X		X		X	X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
091813677	200-18545-19		X										X
	4085230017		X	X		X		X		X	X		
091813686	200-18545-20		X										X
	4085230018		X	X		X		X		X	X		
091813687	200-18545-21		X										X
	4085230019		X	X		X		X		X	X		
091813688	200-18545-22		X									X	X
	4085230020	X	X	X		X		X			X		
091813689	200-18545-23		X										X
	4085230021		X	X		X		X		X	X		
091813690	200-18545-24		X										X
	4085230022		X	X		X		X		X	X		
091813693	200-18545-25		X										X
	4085230023		X	X		X		X		X	X		
091813694	200-18545-26		X										X
	4085230024		X	X		X		X		X	X		
091813695	200-18545-27		X										X
	4085230025		X	X		X		X		X	X		
091913697	200-18545-2			X	X			X	X	X	X		
091913698	200-18545-3							X					
091913699	200-18545-28		X									X	X
	4085230026	X	X	X		X		X			X		
091913700	200-18545-29		X										X
	4085230027		X	X		X		X		X	X		
091913701	200-18545-30		X										X
	4085230028		X	X		X		X		X	X		
091913712	200-18545-31		X									X	X
	4085230029	X	X	X		X		X			X		
091913713	200-18545-32		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4085230030		X	X		X		X		X	X		
091913714	200-18545-33		X										X
	4085230031		X	X		X		X		X	X		
091913716	200-18545-34		X										X
	4085230032		X	X		X		X		X	X		
091913717	200-18545-35		X									X	X
	4085230033	X	X	X		X		X			X		
091913718	200-18545-36		X										X
	4085230034		X	X		X		X		X	X		
091913719	200-18545-37		X										X
	4085230035		X	X		X		X		X	X		
091913730	200-18545-38		X										X
	4085230036		X	X		X		X		X	X		
092313732	200-18620-1			X	X			X	X	X	X		
092313733	200-18620-2							X					
092313734	200-18620-4		X									X	X
	4085483001	X	X	X		X		X	X		X		
092313735	200-18620-5		X										X
	4085483002		X	X		X		X	X	X	X		
092313736	200-18620-6		X										X
	4085483003		X	X		X		X	X	X	X		
092313741	200-18620-7		X										X
	4085483004		X	X		X		X	X	X	X		
092313742	200-18620-8		X										X
	4085483005		X	X		X		X	X	X	X		
092313743	200-18620-9		X										X
	4085483006		X	X		X		X	X	X	X		
092313747	200-18620-10		X										X
	4085483007		X	X		X		X	X	X	X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
092313749	200-18620-11		X									X	X
	4085483008	X	X	X		X		X	X		X		
092313750	200-18620-12		X										X
	4085483009		X	X		X		X	X	X	X		
092313751	200-18620-13		X										X
	4085483010		X	X		X		X	X	X	X		
092313758	200-18620-14		X										X
	4085483011		X	X		X		X	X	X	X		
092313759	200-18620-16		X										X
	4085483013		X	X		X		X	X	X	X		
092313760	200-18620-15		X										X
	4085483012		X	X		X		X	X	X	X		
092313761	200-18620-17		X									X	X
	4085483014	X	X	X		X		X	X		X		
092313762	200-18620-18		X										X
	4085483015		X	X		X		X	X	X	X		
092313763	200-18620-19		X										X
	4085483016		X	X		X		X	X	X	X		
092313772	200-18620-20		X										X
	4085483017		X	X		X		X	X	X	X		
092313773	200-18620-21		X										X
	4085483018		X	X		X		X	X	X	X		
092313774	200-18620-22		X										X
	4085483019		X	X		X		X	X	X	X		
092413775	200-18620-3			X	X			X	X	X	X		
092413776	200-18620-23		X									X	X
	4085483020	X	X	X		X		X	X		X		
092413777	200-18620-24		X										X
	4085483021		X	X		X		X	X	X	X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
092413778	200-18620-25		X										X
	4085483022		X	X		X		X	X	X	X		
092413797	200-18620-26		X										X
	4085483023		X	X		X		X	X	X	X		
092413798	200-18620-27		X										X
	4085483024		X	X		X		X	X	X	X		
092413799	200-18620-28		X									X	X
	4085483025	X	X	X		X		X	X		X		
092413800	200-18620-29		X										X
	4085483026		X	X		X		X	X	X	X		
092413801	200-18620-30		X										X
	4085483027		X	X		X		X	X	X	X		
092413809	200-18620-31		X									X	X
	4085483028	X	X	X		X		X	X		X		
092413810	200-18620-32		X										X
	4085483029		X	X		X		X	X	X	X		
092413811	200-18620-33		X										X
	4085483030		X	X		X		X	X	X	X		
092413813	200-18620-34		X									X	X
	4085483031	X	X	X		X		X	X		X		
092413814	200-18620-35		X										X
	4085483032		X	X		X		X	X	X	X		
092413815	200-18620-36		X										X
	4085483033		X	X		X		X	X	X	X		
092413824	200-18620-37		X										X
	4085483034		X	X		X		X	X	X	X		
092413825	200-18620-38		X										X
	4085483035		X	X		X		X	X	X	X		
092413827	200-18620-39		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4085483036		X	X		X		X	X	X	X		
092513001	200-18668-3		X									X	X
	4085729001	X	X	X		X	X	X	X		X		
092513002	4085729002		X	X		X	X	X	X	X	X		
092513003	200-18668-5		X										X
	4085729003		X	X		X	X	X	X	X	X		
092513009	200-18668-6		X										X
	4085729004		X	X		X	X	X	X	X	X		
092513010	200-18668-7		X										X
	4085729005		X	X		X	X	X	X	X	X		
092513016	200-18723-1		X									X	X
	4085729006	X	X	X		X	X	X	X		X		
092513017	200-18668-8		X										X
	4085729007		X	X		X	X	X	X	X	X		
092513018	200-18668-9		X										X
	4085729008		X	X		X	X	X	X	X	X		
092513022	200-18668-10		X									X	X
	4085729009	X	X	X		X	X	X	X		X		
092513027	200-18668-11		X										X
	4085729010		X	X		X	X	X	X	X	X		
092513028	200-18668-12		X										X
	4085729011		X	X		X	X	X	X	X	X		
092513031	200-18668-13		X										X
	4085729012		X	X		X	X	X	X	X	X		
092513032	200-18668-14		X									X	X
	4085729013	X	X	X		X	X	X	X		X		
092513033	200-18668-15		X										X
	4085729014		X	X		X	X	X	X	X	X		
092513034	200-18668-16		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4085729015		X	X		X	X	X	X	X	X		
092513040	200-18668-17		X										X
	4085729016		X	X		X	X	X	X	X	X		
092513044	200-18668-18		X										X
	4085729017		X	X		X	X	X	X	X	X		
092513045	200-18668-19		X										X
	4085729018		X	X		X	X	X	X	X	X		
092513058	200-18668-20		X									X	X
	4085771036		X							X			
092513828	200-18668-1			X	X			X	X	X	X		
092613047	200-18668-2			X	X			X	X	X	X		
	4085729019	X	X	X		X	X	X	X		X		
092613049	200-18668-21		X										X
	4085729020		X	X		X	X	X	X	X	X		
092613050	200-18668-22		X										X
	4085729021		X	X		X	X	X	X	X	X		
092613065	200-18668-23		X										X
	4085729022		X	X		X	X	X	X	X	X		
092613067	200-18668-24		X										X
	4085729023		X	X		X	X	X	X	X	X		
092613071	200-18668-25		X									X	X
	4085729024	X	X	X		X	X	X	X		X		
092613072	200-18668-26		X										X
	4085729025		X	X		X	X	X	X	X	X		
092613073	200-18668-27		X										X
	4085729026		X	X		X	X	X	X	X	X		
092613086	200-18668-28		X										X
	4085729027		X	X		X	X	X	X	X	X		
092613088	200-18668-29		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4085729028		X	X		X	X	X	X	X	X		
092713094	200-18754-1			X	X		X	X	X	X	X		
092713095	200-18754-5		X									X	X
	4085983001	X	X	X		X	X	X	X		X		
092713096	200-18754-6		X										X
	4085983002		X	X		X	X	X	X	X	X		
092713097	200-18754-7		X										X
	4085983003		X	X		X	X	X	X	X	X		
092713101	200-18754-8		X										X
	4085983004		X	X		X	X	X	X	X	X		
092713107	200-18754-9		X										X
	4085983005		X	X		X	X	X	X	X	X		
092713110	200-18754-10		X										X
	4085983006		X	X		X	X	X	X	X	X		
092713114	200-18754-11		X										X
	4085983007		X	X		X	X	X	X	X	X		
092713115	200-18754-12		X									X	X
	4085983008	X	X	X		X	X	X	X		X		
092713116	200-18754-13		X										X
	4085983009		X	X		X	X	X	X	X	X		
092713118	200-18754-14		X										X
	4085983010		X	X		X	X	X	X	X	X		
092713119	200-18754-15		X										X
	4085983011		X	X		X	X	X	X	X	X		
092713121	200-18754-16		X										X
	4085983012		X	X		X	X	X	X	X	X		
092713127	200-18754-17		X									X	X
	4085983013	X	X	X		X	X	X	X		X		
092713128	200-18754-18		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4085983014		X	X		X	X	X	X	X	X		
093013131	200-18754-2			X	X		X	X	X	X	X		
093013132	200-18754-3							X					
100113139	200-18754-4			X	X		X	X	X	X	X		
100113140	200-18754-19		X									X	X
	4085983015	X	X	X		X	X	X	X		X		
100113141	200-18754-20		X										X
	4085983016		X	X		X	X	X	X	X	X		
100113142	200-18754-21		X										X
	4085983017		X	X		X	X	X	X	X	X		
100113147	200-18754-22		X										X
	4085983018		X	X		X	X	X	X	X	X		
100113155	200-18754-23		X										X
	4085983019		X	X		X	X	X	X	X	X		
100113156	200-18754-24		X										X
	4085983020		X	X		X	X	X	X	X	X		
100113158	200-18754-25		X										X
	4085983021		X	X		X	X	X	X	X	X		
100213164	200-18810-1			X	X		X	X	X	X	X		
100213165	200-18810-2							X					
100213166	200-18810-4		X									X	X
	4086154001	X	X	X		X	X	X	X		X		
100213167	200-18810-5		X										X
	4086154002		X	X		X	X	X	X	X	X		
100213168	200-18810-6		X										X
	4086154003		X	X		X	X	X	X	X	X		
100213172	200-18810-7		X									X	X
	4086154004	X	X	X		X	X	X	X		X		
100213178	200-18810-8		X										X

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
	4086154005		X	X		X	X	X	X	X	X		
100213181	200-18810-9		X										X
	4086154006		X	X		X	X	X	X	X	X		
100213182	200-18810-10		X									X	X
	4086154007	X	X	X		X	X	X	X		X		
100213183	200-18810-11		X										X
	4086154008		X	X		X	X	X	X	X	X		
100213184	200-18810-12		X										X
	4086154009		X	X		X	X	X	X	X	X		
100213191	200-18810-13		X									X	X
	4086154010	X	X	X		X	X	X	X		X		
100213193	200-18810-14		X										X
	4086154011		X	X		X	X	X	X	X	X		
100213194	200-18810-15		X										X
	4086154012		X	X		X	X	X	X	X	X		
100213196	200-18810-16		X									X	X
	4086154013	X	X	X		X	X	X	X		X		
100213197	200-18810-17		X										X
	4086154014		X	X		X	X	X	X	X	X		
100213198	200-18810-18		X										X
	4086154015		X	X		X	X	X	X	X	X		
100213209	200-18810-19		X										X
	4086154016		X	X		X	X	X	X	X	X		
100213210	200-18810-20		X										X
	4086154017		X	X		X	X	X	X	X	X		
100213212	200-18810-21		X										X
	4086154018		X	X		X	X	X	X	X	X		
100313213	200-18810-22		X									X	X
	4086154019	X	X	X		X	X	X	X		X		

Field ID	Lab Sample ID	Alkylated PAH by SIM	ASTM D2974-87	EPA 6020	EPA 7470	EPA 7471	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 9012	Lloyd Kahn-BC	Lloyd Kahn-TOC
100313214	200-18810-23		X										X
	4086154020		X	X		X	X	X	X	X	X		
100313215	200-18810-24		X										X
	4086154021		X	X		X	X	X	X	X	X		
100313231	200-18810-25		X										X
	4086154022		X	X		X	X	X	X	X	X		
100313236	200-18810-26		X										X
	4086154023		X	X		X	X	X	X	X	X		
100313237	200-18810-3			X	X		X	X	X	X	X		
100313238	200-18810-27		X									X	X
	4086154024	X	X	X		X	X	X	X		X		
100313239	200-18810-28		X										X
	4086154025		X	X		X	X	X	X	X	X		
100313240	200-18810-29		X										X
	4086154026		X	X		X	X	X	X	X	X		
100313249	200-18810-30		X										X
	4086154027		X	X		X	X	X	X	X	X		
100313251	200-18810-31		X										X
	4086154028		X	X		X	X	X	X	X	X		
TRIP BLANK 01	200-18170-25							X					

2.0 INORGANIC DATA REVIEW

2.1 Summary

Blank, spiked, and duplicate results were provided. Overall, QC data indicated acceptable precision and accuracy. The results of the QC review are presented below.

2.2 Sample Receipt and Methodology

The sediment samples were analyzed for inorganic parameters following the methods cited in Table 2-1.

Table 2-1. Sediment Inorganic Analytes and Methods Summary

<i>Analytical Method</i>	<i>Analyte</i>
EPA 6020	Metals
EPA 7470/7471	Mercury
EPA 9012	Cyanide
ASTM D2974-87	Percent Moisture
Lloyd Kahn BC	Black Carbon
Lloyd Kahn TOC	Total Organic Carbon

Generally, the samples arrived at the laboratories properly preserved and in good condition. Some of the samples were held in the field for one or two days prior to delivery to the laboratory. Most samples were analyzed within the prescribed holding times, where holding times have been defined. A few of the Total Organic Carbon (TOC) samples were reanalyzed outside of the holding time. Samples 091813690, 100213168, 100213182, 100213191, 100213194, 100213197, 100213210 fall into this category and will all be qualified as estimated ("J") for TOC.

2.3 Blanks

The initial and continuing calibration blanks (ICBs/CCBs) for ICP/MS metals on many occasions gave values slightly above the limit of detection but below the reporting limit (limit of quantitation) for some of these elements. All of the calibration blank values are well below the reporting limit. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

The initial and continuing calibration blanks (ICBs/CCBs) for mercury all gave results below the limit of detection. Therefore, no data are qualified as a consequence of the calibration blank data.

The initial and continuing calibration blanks (ICBs/CCBs) for cyanide all gave results below the limit of detection. Therefore, no data are qualified as a consequence of the calibration blank data.

The initial and continuing calibration blanks (ICBs/CCBs) for Total Organic Carbon and Black Carbon in some cases gave results between the limit of detection and the reporting limit. However, in all cases the measured values in the blanks were at least an order of magnitude lower than measured values in the samples. Therefore no data are qualified as a consequence of the calibration blank data.

Method blanks were prepared for each batch of samples prepared for analysis for each method.

Several batches had some elements detected in the method blanks that were above the limited of detection but below the reporting limit for Method 6020. Those affected batches and elements are detailed in the Method Blank Tables below. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

Some of the method blanks for total cyanide gave a positive value between the limit of detection and the reporting limit. Those affected batches are detailed in the Method Blank Tables below. The effected sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a "U". Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

One of the method blanks for mercury gave a positive value between the limit of detection and the reporting limit. The two field blanks associated with this batch also had detection and results for these two field blanks will be qualified as estimated ("J").

Method blanks for black carbon gave no positive values above the reporting limit. Many of the method blanks for total organic carbon gave a positive value between the limit of detection and the reporting limit. All sample values are considerably more than ten times the detected contamination level reported. In one case the contamination is above the reporting level therefore, TOC for samples 091213473-091213520 with results less than 100,000 mg/Kg will be qualified as estimated ("J")

Twenty-seven equipment blanks were submitted for analysis. Overall most equipment blanks showed some level of contamination for metals. Most of the observed values were between the detection limit and the reporting limit. The data review team would like to make a general comment here, to express concern, that the equipment blanks were all analyzed by a lab different from the lab analyzing the sediment samples. Laboratory QC for the metals blank analyses at the lab analyzing the equipment blanks seem to have more failures overall than would be expected for what should be clean samples. To enable more accurate comparisons of field QC results with the associated samples, Shepherd Technical Services recommends for future sampling events that associated field QC samples be analyzed by the same laboratory as is analyzing the investigative samples. The effected sediment sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a ("U"). Results that are above the reporting limit, but less than ten times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than ten times the reporting limit will not be qualified.

The method blank results are summarized in Tables 2-2 through 2-9.

Table 2-2. Sediment Method 6020 Blank Results Summary (mg/Kg)

<i>Analyte</i>	<i>QC Batch: 139085</i>	<i>QC Batch: 139093</i>	<i>QC Batch: 139351</i>	<i>QC Batch: 139637</i>	<i>QC Batch: 139773</i>	<i>QC Batch: 140405</i>	<i>QC Batch: 140467</i>
Arsenic	0.014 U						
Barium	0.039 U						
Beryllium	0.018 U						
Cadmium	0.013 U						
Chromium	0.027 J	0.028 J	0.024 J	0.027 J	0.025 J	0.024 J	0.029 J
Copper	0.023 U	0.023 U	0.054 J	0.062 J	0.036 J	0.023 U	0.023 U
Lead	0.0084 U	0.0084 U	0.0084 U	0.023 J	0.0084 U	0.0084 U	0.0084 U
Nickel	0.016 U	0.017 J	0.023 J	0.018 J	0.016 U	0.016 U	0.016 U
Selenium	0.031 U						
Silver	0.0026 U						
Zinc	0.58 U						

Table 2-2. Sediment Method 6020 Blank Results Summary (mg/Kg) Cont 1

<i>Analyte</i>	<i>QC Batch: 140715</i>	<i>QC Batch: 140949</i>	<i>QC Batch: 141366</i>	<i>QC Batch: 141561</i>	<i>QC Batch: 141722</i>	<i>QC Batch: 141762</i>	<i>QC Batch: 141766</i>	<i>QC Batch: 142040</i>
Arsenic	0.014 U							
Barium	0.039 U							
Beryllium	0.018 U							
Cadmium	0.013 U							
Chromium	0.023 U	0.028 J	0.25	0.023 U	0.023 U	0.023 U	0.027 J	0.048 J
Copper	0.023 U	0.023 U	0.064 J	0.023 U				
Lead	0.0084 U							
Nickel	0.016 U	0.017 J	0.036 J	0.016 U				
Selenium	0.031 U							
Silver	0.0026 U							
Zinc	0.58 U	2.7	0.58 U					

Table 2-2. Sediment Method 6020 Blank Results Summary (mg/Kg) Cont 2

<i>Analyte</i>	<i>QC Batch: 142196</i>	<i>QC Batch: 142472</i>	<i>QC Batch: 142501</i>	<i>QC Batch: 142618</i>	<i>QC Batch: 143047</i>	<i>QC Batch: 143048</i>	<i>QC Batch: 143483</i>	<i>QC Batch: 143496</i>
Aluminum			1.7 U	2.2 J	1.7 U	1.8 J	1.7 U	1.7 U
Antimony			0.0069 U					
Arsenic	0.014 U							
Barium	0.039 U							
Beryllium	0.018 U	0.018 U						
Cadmium	0.013 U							
Chromium	0.043 J	0.033 J	0.023 U	0.032 J	0.033 J	0.044 J	0.027 J	0.023 U
Copper	0.023 U	0.023 U	0.023 U	0.023 U	0.030 J	0.023 U	0.023 U	0.023 U
Iron			5.7 U					
Lead	0.0084 U	0.011 J	0.0084 U	0.047 J	0.0084 U	0.014 J	0.037 J	0.0090 J
Manganese			0.028 U	0.028 U	0.034 J	0.028 U	0.030 J	0.028 U
Nickel	0.016 J	0.022 J	0.016 U	0.022 J	0.020 J	0.025 J	0.016 U	0.016 U
Selenium	0.031 U							
Silver	0.0026 U	0.0059 J	0.0026 U					
Vanadium			0.023 U					
Zinc	0.58 U							

Table 2-3. Water Method 6020 Method Blank Results Summary (µg/L)

<i>Analyte</i>	<i>QC Batch: 200-60698</i>	<i>QC Batch: 200-60895</i>	<i>QC Batch: 200-61669</i>	<i>QC Batch: 200-61717</i>	<i>QC Batch: 200-61848</i>	<i>QC Batch: 200-62234</i>	<i>QC Batch: 200-62411</i>	<i>QC Batch: 200-62500</i>	<i>QC Batch: 200-63081</i>	<i>QC Batch: 200-63408</i>
Arsenic	0.255 J	0.092 U	0.092 U	0.0920 J		0.092 U	0.101 J		0.092 U	
			0.092 U							
			0.092 U							
Barium	0.42 U	0.42 U	1.32 J	0.615 J		0.42 U	2.78 J		2.47 J	
			0.42 U							
			0.42 U							
Beryllium	0.092 U	0.092 U	0.092 U	0.092 U		0.092 U	0.092 U		0.092 U	
			0.092 U							
			0.092 U							
Cadmium	0.046 U	0.046 U	0.046 U	0.046 U		0.046 U	0.046 U		0.046 U	
			0.046 U							
			0.046 U							
Chromium	0.11 U	0.420 J	0.11 U	0.199 J		0.273 J	0.11 U		0.291 J	
			0.11 U							
			0.11 U							
Copper	0.23 U	0.23 U	0.23 U	0.23 U		0.331 J	0.23 U		0.23 U	
			0.370 J							
			0.23 U							
Lead	0.024 U	0.0380 J	0.0380 J	0.024 U		0.0270 J	0.0330 J		0.024 U	
			0.024 U							
			0.024 U							
Nickel	0.63 U	0.63 U	0.63 U	0.63 U		0.63 U	0.63 U		0.63 U	
			0.63 U							
			0.63 U							
Selenium		1.17 J ^	0.32 U		0.32 U	0.32 U	0.32 U			0.32 U
		1.18 J ^	0.32 U							
			0.32 U							
Silver	0.014 U	0.014 U	0.014 U	0.014 U		0.014 U	0.014 U		0.014 U	
			0.014 U							
			0.014 U							
Zinc	0.50 U	0.640 J	3.48 J	0.825 J		2.42 J		3.37 J		1.15 J ^
			1.46 J							
			2.10 J							

Table 2-4. Sediment Method 7471 Blank Results Summary (mg/Kg)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Mercury	139241	0.0033 U
	139242	0.0033 U
	139578	0.0033 U
	139895	0.0033 U
	139897	0.0033 U
	140382	0.0033 U
	140707	0.0033 U
	140710	0.0033 U
	140958	0.0033 U
	141142	0.0033 U
	141574	0.0033 U
	141993	0.0033 U
	141995	0.0033 U
	141996	0.0033 U
	142372	0.0033 U
	142373	0.0033 U
	142620	0.0033 U
	142821	0.0033 U
	143018	0.0033 U
	143019	0.0033 U
143157	0.0033 U	
143426	0.0033 U	

Table 2-5. Water Method 7470 Method Blank Results Summary (µg/L)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Mercury	180-88279	0.038 U
	200-60670	0.105 J
	200-61137	0.050 U
	200-61659	0.050 U
	200-62447	0.050 U
	200-62633	0.050 U

Table 2-6. Sediment Method 9012 Blank Results Summary (mg/Kg)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Cyanide	139464	0.19 U
	139465	0.19 U
	139615	0.19 U
	139923	0.19 U
	140335	0.19 U
	140830	0.19 U
	140831	0.19 U
	140832	0.19 U
	141414	0.19 U
	141415	0.19 U
	141773	0.19 U
	141775	0.19 U
	142237	0.19 U
	142239	0.20 J
	142575	0.19 U
	142576	0.19 U
	142793	0.19 U
	142795	0.19 U
	142796	0.19 U
	142797	0.19 U
143913	0.28 J	
143914	0.19 U	

Table 2-7. Water Method 9012 Method Blank Results Summary (µg/L)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Cyanide, Total	200-60794	1.6 U
	200-61005	1.6 U
	200-61467	1.6 U
	200-61824	4.57 J
	200-62046	1.6 U
	200-62634	1.6 U

Table 2-8. Sediment Lloyd Kahn TOC Blank Results Summary (mg/Kg)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Total Organic Carbon	200-60732	115.0 J
	200-60894	114.5 J
	200-61035	109 U
	200-61041	120.0 J
	200-61108	114.5 J
	200-61320	110.0 J
	200-61321	115.0 J
	200-61430	109 U
	200-61431	115.0 J
	200-61502	115.0 J
	200-61674	110.0 J
	200-61675	230.0 J
	200-61768	10740
	200-61825	109 U
	200-61839	109 U
	200-61858	110.0 J
	200-61938	109 U
	200-62162	115.0 J
	200-62172	395.0 J
	200-62235	430.0 J
	200-62332	160.0 J
	200-62409	140.0 J
	200-62412	130.0 J
	200-62430	109 U
	200-62493	155.0 J
	200-62652	175.0 J
	200-62759	109 U
	200-63008	109 U
	200-63086	170.0 J
	200-63093	112.5 J
	185.5 J	

Table 2-9. Sediment Lloyd Kahn Black Carbon Blank Results Summary (mg/Kg)

<i>Parameter</i>	<i>Batch</i>	<i>Result</i>
Black Carbon	200-60864	1000 U
	200-61170	1000 U
	200-61337	1000 U
	200-61650	1000 U
	200-61992	1000 U
	200-62374	1000 U
	200-62870	1000 U
	200-63090	1000 U

2.4 Calibration

Initial instrument calibrations for each of the methods were all within acceptance criteria.

2.4.1 Sediment Calibration Verification

Initial instrument calibrations for each of the methods were all well within acceptance criteria. All parameters were calibrated using multi-point curves with appropriate first order regression models applied.

All of the initial calibration verification checks (ICVs) for these analyses met the stated $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the initial calibration verification data.

The laboratory also performed the requisite interference checks (ICS A, ICS AB) with each calibration. All of the interference checks gave acceptable results. Hence, no data are qualified as a consequence of the interference check sample data.

Continuing calibration verification checks were performed at the required frequencies. All of the continuing calibration verification checks (CCVs) for these analyses met the $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the continuing calibration data.

2.4.2 Equipment Blanks Calibration Verification

There were a few instances where the low level calibration verification checks (CCVLs) performed for these analyses did not meet the $\pm 30\%$ acceptance criterion used by the laboratory and required by the methods. Selenium failed at 153%, 154% and 160% for the analysis sequence containing samples 082813083 and

082913126. Since all the failures are above the specified limits, the samples will be qualified as estimated with a potential high bias (“J+”). Any samples values that are reported as non- detects do not need to be qualified. In one other instance zinc failed in the CCV (limit ± 10%) at 118% and 117%. Samples 100213164 and 100313237 from this analytical sequence will be qualified as estimated (“J”).

2.5 Laboratory Control Samples

Laboratory control samples (LCS) were analyzed with each of the data sets. The recovery limits used by the laboratory for LCS results are either those given in the method guidance or are based upon laboratory performance. There was one LCS prepared for available cyanide, which was analyzed multiple times. All results are reported. All recoveries for all analytes/all methods were within the specified limits. No data are qualified as a consequence of the LCS results.

Recoveries are given along with the acceptance limits in Tables 2-10 through 2-17.

Table 2-10. Sediment Method 6020 LCS Results Summary

Analyte	Rec Limits (%)		QC Batch: 139085			QC Batch: 139093			QC Batch: 139351		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Arsenic	80	120	50	51.0	102	50	51.9	104	50	51.2	102
Barium	80	120	50	49.8	100	50	50.1	100	50	51.0	102
Beryllium	80	120	50	49.1	98	50	49.2	98	50	49.8	100
Cadmium	80	120	50	51.6	103	50	51.2	102	50	53.6	107
Chromium	80	120	50	49.8	100	50	50.5	101	50	49.9	100
Copper	80	120	50	50.2	100	50	51.0	102	50	51.6	103
Lead	80	120	50	49.1	98	50	52.1	104	50	51.1	102
Nickel	80	120	50	50.2	100	50	51.6	103	50	51.6	103
Selenium	80	120	50	53.6	107	50	53.0	106	50	54.4	109
Silver	80	120	25	25.6	102	25	26.3	105	25	25.2	101
Zinc	80	120	50	52.1	104	50	52.6	105	50	52.6	105

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 1

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 139637</i>			<i>QC Batch: 139773</i>			<i>QC Batch: 140405</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>
Arsenic	80	120	50	52.7	105	50	50.8	102	50	48.8	98
Barium	80	120	50	48.2	96	50	50.1	100	50	48.4	97
Beryllium	80	120	50	49.2	98	50	51.4	103	50	48.1	96
Cadmium	80	120	50	51.8	104	50	51.5	103	50	48.9	98
Chromium	80	120	50	49.4	99	50	50.1	100	50	46.9	94
Copper	80	120	50	50.6	101	50	50.8	102	50	46.5	93
Lead	80	120	50	49.2	98	50	50.0	100	50	47.5	95
Nickel	80	120	50	51.4	103	50	51.4	103	50	46.6	93
Selenium	80	120	50	54.0	108	50	54.2	108	50	53.1	106
Silver	80	120	25	25.9	104	25	25.9	104	25	23.3	93
Zinc	80	120	50	52.0	104	50	51.6	103	50	50.0	100

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 2

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 140467</i>			<i>QC Batch: 140715</i>			<i>QC Batch: 140949</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>
Arsenic	80	120	50	51.8	104	50	51.6	103	50	51.2	102
Barium	80	120	50	49.7	99	50	50.4	101	50	49.9	100
Beryllium	80	120	50	50.7	101	50	47.7	95	50	47.3	95
Cadmium	80	120	50	51.2	102	50	52.4	105	50	51.2	102
Chromium	80	120	50	49.7	99	50	49.9	100	50	49.7	99
Copper	80	120	50	49.6	99	50	49.7	99	50	49.5	99
Lead	80	120	50	49.8	100	50	48.5	97	50	49.0	98
Nickel	80	120	50	50.2	100	50	50.7	101	50	50.1	100
Selenium	80	120	50	53.3	107	50	52.9	106	50	52.9	106
Silver	80	120	25	25.0	100	25	25.1	100	25	24.7	99
Zinc	80	120	50	52.2	104	50	52.2	104	50	52.2	104

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 3

Analyte	Rec Limits (%)		QC Batch: 141366			QC Batch: 141561			QC Batch: 141722		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Arsenic	80	120	50	50.8	102	50	51.3	103	50	50.7	101
Barium	80	120	50	48.8	98	50	50.2	100	50	48.7	97
Beryllium	80	120	50	47.4	95	50	49.8	100	50	49.9	100
Cadmium	80	120	50	50.5	101	50	51.4	103	50	50.1	100
Chromium	80	120	50	48.5	97	50	49.6	99	50	48.6	97
Copper	80	120	50	48.9	98	50	50.2	100	50	49.1	98
Lead	80	120	50	46.7	93	50	50.4	101	50	49.6	99
Nickel	80	120	50	49.2	98	50	50.8	102	50	49.3	99
Selenium	80	120	50	53.2	106	50	52.3	105	50	53.1	106
Silver	80	120	25	24.6	98	25	24.9	100	25	24.5	98
Zinc	80	120	50	51.4	103	50	52.3	105	50	51.6	103

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 4

Analyte	Rec Limits (%)		QC Batch: 141762			QC Batch: 141766			QC Batch: 142040		
	Lower	Upper	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)	Spike (mg/kg)	Result (mg/kg)	Rec (%)
Arsenic	80	120	50	51.3	103	50	50.2	100	50	51.5	103
Barium	80	120	50	48.8	98	50	49.5	99	50	49.5	99
Beryllium	80	120	50	50.6	101	50	46.7	93	50	48.6	97
Cadmium	80	120	50	50.7	101	50	50.0	100	50	51.4	103
Chromium	80	120	50	49.4	99	50	49.4	99	50	49.7	99
Copper	80	120	50	49.8	100	50	49.4	99	50	49.4	99
Lead	80	120	50	51.1	102	50	47.7	95	50	50.0	100
Nickel	80	120	50	50.2	100	50	49.9	100	50	50.2	100
Selenium	80	120	50	53.8	108	50	52.0	104	50	54.7	109
Silver	80	120	25	24.6	98	25	24.6	98	25	24.7	99
Zinc	80	120	50	52.6	105	50	51.2	102	50	52.9	106

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 5

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 142196</i>			<i>QC Batch: 142501</i>			<i>QC Batch: 142618</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>
Aluminum	80	120				500	498	100	500	495	99
Antimony	80	120				50	52.9	106	50	52.6	105
Arsenic	80	120	50	52.1	104	50	51.4	103	50	50.8	102
Barium	80	120	50	52.2	104	50	51.8	104	50	49.9	100
Beryllium	80	120	50	47.4	95						
Cadmium	80	120	50	52.4	105	50	52.8	106	50	50.8	102
Chromium	80	120	50	49.8	100	50	49.7	99	50	48.7	97
Copper	80	120	50	50.0	100	50	49.4	99	50	48.6	97
Iron	80	120				500	506	101	500	495	99
Lead	80	120	50	50.6	101	50	50.3	101	50	47.2	94
Manganese	80	120				50	49.7	99	50	48.4	97
Nickel	80	120	50	50.8	102	50	49.7	99	50	49.1	98
Selenium	80	120	50	54.2	108	50	54.4	109	50	51.9	104
Silver	80	120	25	25.2	101	25	24.7	99	25	24.1	96
Vanadium	80	120				50	49.4	99	50	48.3	97
Zinc	80	120	50	52.9	106	50	52.4	105	50	51.0	102

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 6

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 143047</i>			<i>QC Batch: 143048</i>			<i>QC Batch: 143483</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Rec (%)</i>
Aluminum	80	120	500	499	100	500	493	99	500	500	100
Antimony	80	120	50	52.5	105	50	50.2	100	50	51.6	103
Arsenic	80	120	50	49.5	99	50	49.3	99	50	51.3	103
Barium	80	120	50	50.1	100	50	48.7	97	50	49.6	99
Cadmium	80	120	50	51.5	103	50	49.8	100	50	51.0	102
Chromium	80	120	50	49.0	98	50	48.8	98	50	50.4	101
Copper	80	120	50	49.0	98	50	49.4	99	50	50.7	101
Iron	80	120	500	494	99	500	496	99	500	506	101
Lead	80	120	50	47.2	94	50	50.6	101	50	52.8	106
Manganese	80	120	50	48.2	96	50	48.3	97	50	49.6	99
Nickel	80	120	50	49.2	98	50	49.6	99	50	51.2	102
Selenium	80	120	50	51.2	102	50	50.9	102	50	52.5	105
Silver	80	120	25	24.9	100	25	24.6	99	25	25.2	101
Vanadium	80	120	50	48.6	97	50	48.4	97	50	50.0	100
Zinc	80	120	50	50.7	101	50	50.4	101	50	51.9	104

Table 2-10. Sediment Method 6020 LCS Results Summary Cont 7

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 143496</i>			<i>QC Batch: 142472</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Recovery (%)</i>
Aluminum	80	120	500	495	99			
Antimony	80	120	50	51.4	103			
Arsenic	80	120	50	50.4	101	50	50.3	101
Barium	80	120	50	49.3	99	50	48.9	98
Beryllium	80	120				50	47.2	94
Cadmium	80	120	50	51.5	103	50	51.3	103
Chromium	80	120	50	49.3	99	50	49.5	99
Copper	80	120	50	49.4	99	50	49.8	100
Iron	80	120	500	496	99			
Lead	80	120	50	49.0	98	50	48.7	97
Manganese	80	120	50	49.4	99			
Nickel	80	120	50	49.5	99	50	49.8	100
Selenium	80	120	50	52.9	106	50	53.8	108
Silver	80	120	25	24.5	98	25	24.4	98
Vanadium	80	120	50	48.8	98			
Zinc	80	120	50	51.4	103	50	52.1	104

Table 2-11. Water Method 6020 LCS Results Summary

Analyte	Rec Limits (%)		QC Batch: 200-60698			QC Batch: 200-60895			QC Batch: 200-61669		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
Arsenic	80	120	12.5	10.79	86	12.5	10.83	87	25.0	22.00	88
									25.0	21.50	86
									25.0	22.05	88
Barium	80	120	625	595.4	95	625	595.8	95	1250	1219	98
									1250	1149	92
									1250	1176	94
Beryllium	80	120	12.5	11.47	92	12.5	11.65	93	25.0	23.67	95
									25.0	23.08	92
									25.0	23.43	94
Cadmium	80	120	12.5	11.35	91	12.5	11.91	95	25.0	23.80	95
									25.0	22.98	92
									25.0	23.43	94
Chromium	80	120	25.0	24.01	96	25.0	25.05	100	50.0	52.95	106
									50.0	50.12	100
									50.0	50.81	102
Copper	80	120	25.0	23.51	94	25.0	24.59	98	50.0	51.63	103
									50.0	49.48	99
									50.0	50.09	100
Lead	80	120	12.5	12.18	97	12.5	11.93	95	25.0	26.65	107
									25.0	25.22	101
									25.0	25.59	102
Nickel	80	120	25.0	23.58	94	25.0	24.30	97	50.0	51.95	104
									50.0	49.38	99
									50.0	50.30	101
Selenium	80	120				12.5	10.07 ^	81	25.0	21.68	87
						12.5	10.43 ^	83	25.0	21.50	86
									25.0	21.82	87
Silver	80	120	12.5	11.72	94	12.5	12.52	100	25.0	24.62	98
									25.0	22.42	90
									25.0	24.04	96
Zinc	80	120	25.0	21.18	85	25.0	23.01	92	50.0	51.71	103
									50.0	49.44	99
									50.0	49.13	98

Table 2-11. Water Method 6020 LCS Results Summary Cont 1

Analyte	Rec Limits (%)		QC Batch: 200-61717			QC Batch: 200-62234		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
Arsenic	80	120	25.0	21.95	88	25.0	26.20	105
Barium	80	120	1250	1236	99	1250	1298	104
Beryllium	80	120	25.0	23.02	92	25.0	26.93	108
Cadmium	80	120	25.0	23.45	94	25.0	26.43	106
Chromium	80	120	50.0	52.78	106	50.0	55.20	110
Copper	80	120	50.0	53.97	108	50.0	54.15	108
Lead	80	120	25.0	26.93	108	25.0	26.83	107
Nickel	80	120	50.0	50.39	101	50.0	53.09	106
Selenium	80	120				25.0	25.38	102
Silver	80	120	25.0	25.19	101	25.0	26.59	106
Zinc	80	120	50.0	44.56	89	50.0	56.67	113

Table 2-11. Water Method 6020 LCS Results Summary Cont 2

Analyte	Rec Limits (%)		QC Batch: 200-62411			QC Batch: 200-63081		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
Arsenic	80	120	25.0	24.38	98	25.0	23.88	96
Barium	80	120	1250	1243	99	1250	1220	98
Beryllium	80	120	25.0	25.59	102	25.0	24.73	99
Cadmium	80	120	25.0	25.88	104	25.0	24.84	99
Chromium	80	120	50.0	52.50	105	50.0	50.32	101
Copper	80	120	50.0	49.86	100	50.0	51.52	103
Lead	80	120	25.0	25.02	100	25.0	25.90	104
Nickel	80	120	50.0	52.72	105	50.0	50.87	102
Selenium	80	120	25.0	22.40	90			
Silver	80	120	25.0	24.80	99	25.0	24.87	99

Table 2-11. Water Method 6020 LCS Results Summary Cont 3

Analyte	Rec Limits (%)		QC Batch: 200-62500			QC Batch: 200-61848			QC Batch: 200-63408		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
Selenium	80	120				25.0	20.12	80	25.0	21.26	85
Zinc	80	120	50.0	45.13	90				50.0	48.61 ^	97

Table 2-12. Sediment Method 7471 LCS Results Summary

<i>Analyte</i>	<i>QC Batch</i>	<i>Recovery Limits (%)</i>		<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Recovery (%)</i>
		<i>Lower</i>	<i>Upper</i>			
Mercury	139241	85	115	.17	0.18	106
Mercury	139242	85	115	.17	0.16	98
Mercury	139578	85	115	.17	0.17	100
Mercury	139895	85	115	.17	0.17	102
Mercury	139897	85	115	.17	0.17	102
Mercury	140382	85	115	.17	0.19	112
Mercury	140707	85	115	.17	0.17	103
Mercury	140710	85	115	.17	0.15	89
Mercury	140958	85	115	.17	0.17	102
Mercury	141142	85	115	.17	0.18	106
Mercury	141574	85	115	.17	0.17	102
Mercury	141993	85	115	.17	0.17	104
Mercury	141995	85	115	.17	0.17	102
Mercury	141996	85	115	.17	0.18	106
Mercury	142372	85	115	.17	0.17	102
Mercury	142373	85	115	.17	0.17	101
Mercury	142620	85	115	.17	0.18	106
Mercury	142821	85	115	.17	0.17	103
Mercury	143018	85	115	.17	0.17	102
Mercury	143019	85	115	.17	0.17	102
Mercury	143157	85	115	.17	0.18	105
Mercury	143426	85	115	.17	0.17	99

Table 2-13. Water Method 7470 LCS Results Summary

<i>Analyte</i>	<i>QC Batch</i>	<i>Recovery Limits (%)</i>		<i>Spike (µg/L)</i>	<i>Result (µg/L)</i>	<i>Recovery (%)</i>
		<i>Lower</i>	<i>Upper</i>			
Mercury	180-88279	80	120	2.50	2.42	97
Mercury	200-60670	85	115	1.00	1.00	100
Mercury	200-61137	85	115	1.00	1.01	101
Mercury	200-61659	85	115	1.00	1.01	101
Mercury	200-62447	85	115	1.00	1.05	105
Mercury	200-62633	85	115	1.00	0.927	93

Table 2-14. Sediment Method 9012 LCS Results Summary

<i>Analyte</i>	<i>QC Batch</i>	<i>Recovery Limits (%)</i>		<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Recovery (%)</i>
		<i>Lower</i>	<i>Upper</i>			
Cyanide	139464	80	120	3	3.1	105
Cyanide	139465	80	120	3	2.9	98
Cyanide	139615	80	120	3	3.0	102
Cyanide	139923	80	120	3	3.0	101
Cyanide	140335	80	120	3	3.0	100
Cyanide	140830	80	120	3	3.0	99
Cyanide	140831	80	120	3	2.8	93
Cyanide	140832	80	120	3	2.9	95
Cyanide	141414	80	120	3	3.1	103
Cyanide	141415	80	120	3	2.8	94
Cyanide	141773	80	120	3	3.0	98
Cyanide	141775	80	120	3	2.9	95
Cyanide	142237	80	120	3	2.9	96
Cyanide	142239	80	120	3	2.8	94
Cyanide	142575	80	120	3	2.9	97
Cyanide	142576	80	120	3	2.9	98
Cyanide	142793	80	120	3	2.9	97
Cyanide	142795	80	120	3	2.9	96
Cyanide	142796	80	120	3	3.0	100
Cyanide	142797	80	120	3	3.0	101
Cyanide	143913	80	120	3	3.0	101
Cyanide	143914	80	120	3	3.0	99

Table 2-15. Water Method 9012 LCS Results Summary

<i>Analyte</i>	<i>QC Batch</i>	<i>Recovery Limits (%)</i>		<i>Spike (µg/L)</i>	<i>Result (µg/L)</i>	<i>Recovery (%)</i>
		<i>Lower</i>	<i>Upper</i>			
Cyanide, Total	200-60794	85	115	120	124.3	104
Cyanide, Total	200-61005	85	115	120	123.8	103
Cyanide, Total	200-61467	85	115	120	117.7	98
Cyanide, Total	200-61824	85	115	120	125.0	104
Cyanide, Total	200-62046	85	115	120	123.6	103
Cyanide, Total	200-62634	85	115	120	124.4	104

Table 2-16. Sediment Lloyd Kahn TOC LCS Results Summary

<i>Analyte</i>	<i>QC Batch</i>	<i>Recovery Limits (%)</i>		<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Recovery (%)</i>
		<i>Lower</i>	<i>Upper</i>			
Total Organic Carbon	200-60732	75	125	20100	20850	104
Total Organic Carbon	200-60894	75	125	20100	20750	103
Total Organic Carbon	200-61035	75	125	20100	20150	100
Total Organic Carbon	200-61041	75	125	20100	21340	106
Total Organic Carbon	200-61108	75	125	20100	20710	103
Total Organic Carbon	200-61320	75	125	20100	20630	103
Total Organic Carbon	200-61321	75	125	20100	20270	101
Total Organic Carbon	200-61430	75	125	20100	20400	101
Total Organic Carbon	200-61431	75	125	20100	20890	104
Total Organic Carbon	200-61502	75	125	20100	20160	100
Total Organic Carbon	200-61674	75	125	20100	21140	105
Total Organic Carbon	200-61675	75	125	20100	20960	104
Total Organic Carbon	200-61768	75	125	20100	20770	103
Total Organic Carbon	200-61825	75	125	20100	19220	96
Total Organic Carbon	200-61839	75	125	20100	19000	95
Total Organic Carbon	200-61858	75	125	20100	19530	97
Total Organic Carbon	200-61938	75	125	20100	20150	100
Total Organic Carbon	200-62162	75	125	20100	20010	100
Total Organic Carbon	200-62172	75	125	20100	18370	91
Total Organic Carbon	200-62235	75	125	20100	22870	114
Total Organic Carbon	200-62332	75	125	20100	21260	106
Total Organic Carbon	200-62409	75	125	20100	20670	103
Total Organic Carbon	200-62412	75	125	20100	22420	112
Total Organic Carbon	200-62430	75	125	20100	20580	102
Total Organic Carbon	200-62493	75	125	20100	23940	119
Total Organic Carbon	200-62652	75	125	20100	19070	95
Total Organic Carbon	200-62759	75	125	20100	22390	111
Total Organic Carbon	200-63008	75	125	20100	20360	101
Total Organic Carbon	200-63086	75	125	20100	19760	98
Total Organic Carbon	200-63093	75	125	20100	21610	108
Total Organic Carbon		75	125	20100	22240	111

Table 2-17. Sediment Lloyd Kahn Black Carbon LCS Results Summary

<i>Analyte</i>	<i>QC Batch</i>	<i>Recovery Limits (%)</i>		<i>Spike (mg/kg)</i>	<i>Result (mg/kg)</i>	<i>Recovery (%)</i>
		<i>Lower</i>	<i>Upper</i>			
Black Carbon	200-60864	50	150	9900	8005	81
Black Carbon	200-61170	50	150	9900	8065	81
Black Carbon	200-61337	50	150	9900	8570	87
Black Carbon	200-61650	50	150	9900	8345	84
Black Carbon	200-61992	50	150	9900	6950	70
Black Carbon	200-62374	50	150	9900	7366	74
Black Carbon	200-62870	50	150	9900	10430	105
Black Carbon	200-63090	50	150	9900	8815	89

2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were evaluated for each of the parameters at appropriate frequencies.

It is important to note all matrix spike analyses on water samples were performed using equipment blanks.

Most MS/MSDs failed to recover within the acceptance limits for multiple analytes. In some cases, the failures were assignable to a low spike concentration relative to the amount present in the parent sample (i.e., sample amount exceeded 4x the spike concentration). Such circumstances do not merit qualification of the data. All ICP-MS MS/MSD samples had post digestion spikes analyzed that fell within the acceptable range of recovery with the exception of one selenium water sample, addressed below. For ICP results, recoveries less than 75% will be qualified as estimated "J" above the MDL, and estimated as "UJ" for non-detects, recoveries greater than 125%, results above the MDL will be qualified as estimate "J". For available cyanide and mercury results, recoveries less than 30%, results greater than MDL will be qualified as estimated low "J-" and non-detects as unusable "R", recoveries between 30-74% above MDL qualified as estimated low "J-" and non-detects as estimated "UJ", recoveries above 125% above MDL will be qualified as estimated high "J+". All qualifications we be for the parent sample and MS/MSD only. The one exception to this is the MS run for selenium on the equipment blank, which also failed the post digestion spike. Selenium results for these prep batches will be qualified as estimated low ("J-") or ("UJ")

The MS/MSD data are given in Tables 2-18 through 2-23.

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 082613003

<i>Analyte</i>	<i>MS Sample ID: 082613003</i>			<i>MSD Sample ID: 082613003</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	120	124	96	120	126	98	1	8.7	20
Barium	120	360	85	120	371	95	3	258	20
Beryllium	120	119	98	120	115	95	3	0.76 JD3	20
Cadmium	120	127	98	120	126	98	1	8.9	20
Chromium	120	228	83	120	238	92	5	128	20
Copper	120	389	107	120	375	96	4	260	20
Lead	120	387	72	120	391	75	1	300 M0	20
Nickel	120	168	97	120	167	97	1	51.3	20
Selenium	120	126	102	120	124	101	1	2.7	20
Silver	60.2	64.4	94	60.2	64	94	1	7.7	20
Zinc	120	989	73	120	1030	107	4	901 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 082713075

<i>Analyte</i>	<i>MS Sample ID: 082713075</i>			<i>MSD Sample ID: 082713075</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	61.8	74.2	103	61.8	72	100	3	10.3	20
Barium	61.8	119	115	61.8	126	127	6	48.1 M0	20
Beryllium	61.8	61.4	98	61.8	60.6	97	1	0.84 JD3	20
Cadmium	61.8	63.3	100	61.8	63.7	101	1	1.7	20
Chromium	61.8	103	102	61.8	116	123	12	40.0	20
Copper	61.8	101	100	61.8	109	114	8	39.2	20
Lead	61.8	90.4	98	61.8	103	119	13	29.9	20
Nickel	61.8	100	99	61.8	101	101	1	38.6	20
Selenium	61.8	63.9	100	61.8	64.6	102	1	2.0	20
Silver	30.9	30.8	98	30.9	31.2	100	1	0.45 JD3	20
Zinc	61.8	158	94	61.8	192	152	20	99.2 M0, R1	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 082813097

<i>Analyte</i>	<i>MS Sample ID: 082813097</i>			<i>MSD Sample ID: 082813097</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	104	119	96	104	120	97	1	19.2	20
Barium	104	612	85	104	599	72	2	523 P6	20
Beryllium	104	105	100	104	106	101	1	1.1 JD3	20
Cadmium	104	322	118	104	305	100	6	200	20
Chromium	104	1020	45	104	988	14	3	974 P6	20
Copper	104	805	98	104	796	89	1	703	20
Lead	104	1210	80	104	1230	95	1	1130	20
Nickel	104	303	105	104	303	104	0	194	20
Selenium	104	104	96	104	104	96	1	4.0	20
Silver	52.1	78.4	94	52.1	77.5	92	1	29.3	20
Zinc	104	3140	166	104	3120	143	1	2970 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 090313183

<i>Analyte</i>	<i>MS Sample ID: 090313183</i>			<i>MSD Sample ID: 090313183</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	124	135	101	124	140	105	4	8.7	20
Barium	124	374	101	124	354	85	5	247	20
Beryllium	124	123	98	124	127	101	3	0.73 JD3	20
Cadmium	124	133	100	124	138	103	3	9.3	20
Chromium	124	239	94	124	241	95	1	122	20
Copper	124	362	79	124	401	110	10	264	20
Lead	124	422	95	124	413	88	2	303	20
Nickel	124	182	100	124	195	110	7	58.2	20
Selenium	124	129	101	124	137	107	6	3.5	20
Silver	62.4	70.0	100	62.4	72.5	104	4	7.9	20
Zinc	124	963	99	124	996	126	3	839 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 090313209

<i>Analyte</i>	<i>MS Sample ID: 090313204</i>			<i>MSD Sample ID: 090313209</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	58.8	72.2	101	58.8	70.2	98	3	12.5	20
Barium	58.8	118	118	58.8	117	116	1	48.0	20
Beryllium	58.8	56.0	94	58.8	54.7	91	2	0.79 JD3	20
Cadmium	58.8	59.7	101	58.8	58.7	99	2	0.23 JD3	20
Chromium	58.8	86.5	102	58.8	89.6	107	3	26.4	20
Copper	58.8	92.3	92	58.8	94.4	96	2	37.9	20
Lead	58.8	76.6	97	58.8	75.5	95	1	19.3	20
Nickel	58.8	96.3	101	58.8	93.5	96	3	37.0	20
Selenium	58.8	64.9	107	58.8	61.2	100	6	1.9	20
Silver	29.4	27.6	94	29.4	27	91	2	0.097 JB, D3	20
Zinc	58.8	121	105	58.8	134	127	10	58.5 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 090513236

<i>Analyte</i>	<i>MS Sample ID: 090513236</i>			<i>MSD Sample ID: 090513236</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	117	125	100	117	125	100	0	8.2	20
Barium	117	344	90	117	339	86	1	239	20
Beryllium	117	120	102	117	120	102	0	1.0 JD3	20
Cadmium	117	125	97	117	126	99	1	11.0	20
Chromium	117	241	112	117	234	106	3	110	20
Copper	117	478	194	117	378	108	24	252 M0, R1	20
Lead	117	385	74	117	374	64	3	299 M0	20
Nickel	117	172	101	117	169	98	2	54.1	20
Selenium	117	123	103	117	126	105	2	2.8	20
Silver	58.5	66.0	99	58.5	65.5	98	1	8.3	20
Zinc	117	916	70	117	917	70	0	835 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 090613298

<i>Analyte</i>	<i>MS Sample ID: 090613298</i>			<i>MSD Sample ID: 090613298</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	118	122	95	118	122	94	1	10.6	20
Barium	118	439	109	118	473	137	7	311 M0	20
Beryllium	118	115	96	118	116	96	1	1.2 JD3	20
Cadmium	118	145	93	118	150	97	4	35.1	20
Chromium	118	404	91	118	439	120	8	296	20
Copper	118	499	88	118	505	92	1	396	20
Lead	118	631	91	118	668	122	6	523	20
Nickel	118	243	94	118	257	105	5	133	20
Selenium	118	120	99	118	119	98	1	3.6	20
Silver	58.8	68.0	90	58.8	69.5	92	2	15.2	20
Zinc	118	1390	135	118	1480	210	6	1230 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 090913332

<i>Analyte</i>	<i>MS Sample ID: 090913332</i>			<i>MSD Sample ID: 090913332</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	59.8	72.4	98	59.8	74.2	101	2	13.7	20
Barium	59.8	108	102	59.8	106	98	2	47.6	20
Beryllium	59.8	60.7	100	59.8	60.3	99	1	0.92 JD3	20
Cadmium	59.8	60.6	98	59.8	59.4	95	2	2.2	20
Chromium	59.8	107	27	59.8	96.4	10	10	90.7 M0	20
Copper	59.8	103	101	59.8	92.3	82	11	42.7	20
Lead	59.8	81.7	75	59.8	79.1	70	3	36.9 M0	20
Nickel	59.8	94.9	95	59.8	97.3	99	2	37.9	20
Selenium	59.8	63.3	103	59.8	63.8	103	1	1.7	20
Silver	29.9	28.2	93	29.9	27.9	91	1	0.50 JD3	20
Zinc	59.8	133	-69	59.8	136	-63	3	174 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 091013399

Analyte	MS Sample ID: 091013399			MSD Sample ID: 091013399			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Arsenic	118	127	101	118	128	102	1	8.5	20
Barium	118	398	104	118	448	147	12	275 M0	20
Beryllium	118	111	93	118	111	93	0	1.1 JD3	20
Cadmium	118	131	95	118	145	108	11	17.9	20
Chromium	118	267	85	118	359	163	29	167 M0, R1	20
Copper	118	393	89	118	458	144	15	289 M0	20
Lead	118	494	95	118	644	222	26	382 M0, R1	20
Nickel	118	192	90	118	242	133	23	86.0 M0, R1	20
Selenium	118	124	103	118	122	102	1	2.2 JD3	20
Silver	59.1	69.4	95	59.1	74.5	104	7	13.1	20
Zinc	118	1130	54	118	1380	265	20	1060 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 091113424

Analyte	MS Sample ID: 091113424			MSD Sample ID: 091113424			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Arsenic	92.8	100	100	92.8	98.6	99	2	7.3	20
Barium	92.8	266	96	92.8	474	322	56	176 M0, R1	20
Beryllium	92.8	86.0	92	92.8	86.5	93	1	0.66 JD3	20
Cadmium	92.8	104	104	92.8	98.9	98	6	8.1	20
Chromium	92.8	180	90	92.8	180	91	0	96.2	20
Copper	92.8	292	45	92.8	284	36	3	250 M0	20
Lead	92.8	480	324	92.8	409	249	16	179 M0	20
Nickel	92.8	132	85	92.8	132	85	0	53.0	20
Selenium	92.8	98.9	105	92.8	96.6	103	2	1.4 JD3	20
Silver	46.4	52.5	96	46.4	52.8	97	1	8.1	20
Zinc	92.8	635	105	92.8	743	222	16	537 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 091213474

Analyte	MS Sample ID: 091213474			MSD Sample ID: 091213474			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Arsenic	127	138	100	127	136	99	1	9.6	20
Barium	127	465	124	127	451	113	3	306	20
Beryllium	127	123	96	127	123	95	0	0.76 JD3	20
Cadmium	127	168	99	127	171	101	2	41.6	20
Chromium	127	410	113	127	408	110	0	267	20
Copper	127	490	102	127	487	98	1	361	20
Lead	127	554	116	127	514	85	7	406	20
Nickel	127	265	103	127	259	97	2	134	20
Selenium	127	132	101	127	137	104	4	3.3	20
Silver	63.6	86.6	97	63.6	87.9	98	2	25.0	20
Zinc	127	1470	132	127	1430	98	3	1300 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 091613545

Analyte	MS Sample ID: 091613545			MSD Sample ID: 091613545			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Arsenic	115	127	102	115	126	100	1	10	20
Barium	115	464	146	115	400	90	15	296 M0	20
Beryllium	115	117	101	115	118	101	1	0.98 JD3	20
Cadmium	115	163	104	115	151	94	7	42.7	20
Chromium	115	569	202	115	356	17	46	336 M0, R1	20
Copper	115	462	136	115	381	66	19	305 M0	20
Lead	115	625	185	115	662	216	6	412 M0	20
Nickel	115	273	149	115	209	92	27	102 M0, R1	20
Selenium	115	121	102	115	118	99	2	3.6	20
Silver	57.7	73.1	96	57.7	73.6	96	1	18.1	20
Zinc	115	1390	162	115	1120	-73	22	1210 P6, R1	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 091713609

Analyte	MS Sample ID: 091713609			MSD Sample ID: 091713609			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Arsenic	102	158	102	102	159	103	1	54.4	20
Barium	102	784	112	102	771	99	2	670	20
Beryllium	102	103	100	102	103	100	0	1.2 JD3	20
Cadmium	102	177	103	102	179	105	1	72.3	20
Chromium	102	2850	870	102	2630	654	8	1970 P6	20
Copper	102	672	84	102	699	111	4	586	20
Lead	102	1030	78	102	1000	50	3	953 P6	20
Nickel	102	210	102	102	205	97	3	106	20
Selenium	102	109	102	102	109	103	0	4.3	20
Silver	51.1	62.2	97	51.1	61.1	95	2	12.9	20
Zinc	102	2630	128	102	2700	197	3	2500 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 091813657

Analyte	MS Sample ID: 091813657			MSD Sample ID: 091813657			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Arsenic	115	122	97	115	130	104	7	10.6	20
Barium	115	499	86	115	527	110	5	401	20
Beryllium	115	115	100	115	124	106	7	0.95 JD3	20
Cadmium	115	163	90	115	178	102	9	60.4	20
Chromium	115	550	46	115	638	122	15	497 P6	20
Copper	115	609	59	115	642	87	5	541 P6	20
Lead	115	909	37	115	1030	138	12	867 P6	20
Nickel	115	305	81	115	318	92	4	212	20
Selenium	115	120	101	115	127	107	6	3.7	20
Silver	57.3	79.1	91	57.3	83.9	98	6	27.3	20
Zinc	115	1790	-37	115	1910	71	7	1830 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 091913713

<i>Analyte</i>	<i>MS Sample ID: 091913713</i>			<i>MSD Sample ID: 091913713</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	59.3	69.7	100	59.3	71.7	104	3	10.1	20
Barium	59.3	119	105	59.3	112	94	6	56.3	20
Beryllium	59.3	54.9	91	59.3	55.1	91	0	0.85 JD3	20
Cadmium	59.3	61.0	99	59.3	59.1	95	3	2.6	20
Chromium	59.3	112	79	59.3	91.9	46	19	64.7 M0	20
Copper	59.3	94.7	92	59.3	87.5	79	8	40.3	20
Lead	59.3	123	116	59.3	78.5	41	44	54.0 M0, R1	20
Nickel	59.3	96.8	100	59.3	94.8	97	2	37.4	20
Selenium	59.3	63.2	104	59.3	61.7	101	2	1.7	20
Silver	29.7	28.6	95	29.7	27.8	92	3	0.49 JD3	20
Zinc	59.3	152	80	59.3	121	28	23	104 M0, R1	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 092313758

<i>Analyte</i>	<i>MS Sample ID: 092313758</i>			<i>MSD Sample ID: 092313758</i>			<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Recovery (%)</i>			
Arsenic	58.1	72.3	103	58.1	70.7	100	2	12.6	20
Barium	58.1	103	113	58.1	101	110	2	37.6	20
Beryllium	58.1	55.7	95	58.1	55.3	94	1	0.74 JD3	20
Cadmium	58.1	58.8	99	58.1	58.8	99	0	1.3	20
Chromium	58.1	84.9	99	58.1	84.8	99	0	27.5	20
Copper	58.1	90.8	92	58.1	91.4	93	1	37.1	20
Lead	58.1	77.2	95	58.1	77.9	96	1	22.0	20
Nickel	58.1	94.0	103	58.1	93.3	101	1	34.4	20
Selenium	58.1	64.3	108	58.1	63.1	106	2	1.7	20
Silver	29	27.6	94	29	27.3	93	1	0.25 JD3	20
Zinc	58.1	120	82	58.1	119	81	0	72.1	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 092413814

Analyte	MS Sample ID: 092413814			MSD Sample ID: 092413814			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Arsenic	126	137	102	126	139	103	2	8.5	20
Barium	126	407	116	126	417	124	2	261	20
Beryllium	126	123	97	126	126	99	3	0.64 JD3	20
Cadmium	126	138	102	126	143	106	4	8.9	20
Chromium	126	242	99	126	242	99	0	117	20
Copper	126	376	96	126	391	107	4	255	20
Lead	126	375	85	126	413	115	10	267	20
Nickel	126	177	100	126	182	104	3	50.1	20
Selenium	126	135	104	126	135	104	0	3.2	20
Silver	63.2	72.8	100	63.2	73.2	100	1	9.5	20
Zinc	126	966	95	126	1010	126	4	847 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 092513017

Analyte	MS Sample ID: 092513017			MSD Sample ID: 092513017			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Aluminum	1080	16400	393	1080	15600	318	5	12200 P6	20
Antimony	108	74.0	62	108	77	65	4	6.8 M0	20
Arsenic	108	126	100	108	125	99	1	17.4	20
Barium	108	638	131	108	625	118	2	496 P6	20
Cadmium	108	162	99	108	167	103	3	55.0	20
Chromium	108	722	38	108	776	88	7	681 P6	20
Copper	108	560	76	108	569	84	2	478	20
Iron	1080	23500	108	1080	23400	96	1	22300	20
Lead	108	1010	92	108	1020	97	1	911	20
Manganese	108	362	105	108	367	109	1	248	20
Nickel	108	309	90	108	322	103	4	211	20
Selenium	108	112	100	108	116	103	3	3.9	20
Silver	54.2	69.4	94	54.2	70.5	96	2	18.6	20
Vanadium	108	124	103	108	120	99	3	12.2	20
Zinc	108	2480	23	108	2530	66	2	2460 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 100113158

Analyte	MS Sample ID: 100113158			MSD Sample ID: 100113158			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Aluminum	606	18900	977	606	18700	944	1	13000 P6	20
Antimony	60.6	23.6	38	60.6	23.8	38	1	0.65 JD3, M0	20
Arsenic	60.6	71.2	95	60.6	71.5	96	0	13.3	20
Barium	60.6	124	87	60.6	128	93	3	71.2	20
Cadmium	60.6	61.2	99	60.6	61.7	99	1	1.4	20
Chromium	60.6	91.2	62	60.6	98.3	74	8	53.5 M0	20
Copper	60.6	93.4	73	60.6	95.8	77	3	48.8 M0	20
Iron	606	26100	364	606	26100	370	0	23900 P6	20
Lead	60.6	82.8	38	60.6	92.6	54	11	59.7 M0	20
Manganese	60.6	478	101	60.6	505	146	6	416 P6	20
Nickel	60.6	95.1	99	60.6	95.6	100	1	34.9	20
Selenium	60.6	63.6	101	60.6	62.2	98	2	2.5	20
Silver	30.4	28.5	92	30.4	28.8	93	1	0.62	20
Vanadium	60.6	96.3	114	60.6	97.1	115	1	27.2	20
Zinc	60.6	168	-13	60.6	143	-54	16	176 M0	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 092713101

Analyte	MS Sample ID: 092713101			MSD Sample ID: 092713101			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Aluminum	951	12500	369	951	12400	356	1	9010 P6	20
Antimony	95.1	67.1	65	95.1	69.8	68	4	4.7 M0	20
Arsenic	95.1	114	99	95.1	116	100	2	19.6	20
Barium	95.1	503	84	95.1	548	130	9	423 P6	20
Cadmium	95.1	153	104	95.1	152	103	0	53.7	20
Chromium	95.1	790	76	95.1	1230	539	44	718 P6, R1	20
Copper	95.1	496	91	95.1	508	103	2	409	20
Iron	951	19900	-666	951	21200	-530	6	26300 P6	20
Lead	95.1	758	126	95.1	858	230	12	638 P6	20
Manganese	95.1	307	6	95.1	328	28	7	301 M0	20
Nickel	95.1	272	97	95.1	283	108	4	180	20
Selenium	95.1	99.0	101	95.1	102	103	3	3.0	20
Silver	47.6	56.8	96	47.6	58.2	98	2	11.3	20
Vanadium	95.1	144	99	95.1	160	115	11	50.2	20
Zinc	95.1	1700	2	95.1	1720	27	1	1700 P6	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 100213178

Analyte	MS Sample ID: 082713051			MSD Sample ID: 100213178			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Aluminum	590	17200	756	590	16700	674	3	12800 P6	20
Antimony	59	22.8	38	59	22.4	37	2	0.52 JD3, M0	20
Arsenic	59	74.0	104	59	72	101	3	12.6	20
Barium	59	107	117	59	105	114	2	37.9	20
Cadmium	59	60.8	102	59	59.9	101	1	0.46 JD3	20
Chromium	59	85.0	106	59	86.7	109	2	22.4	20
Copper	59	94.2	91	59	103	105	9	40.8	20
Iron	590	26500	338	590	34800	1740	27	24500 P6, R1	20
Lead	59	76.2	99	59	80.7	107	6	17.5	20
Manganese	59	494	123	59	507	146	3	421 P6	20
Nickel	59	97.1	103	59	97.4	103	0	36.6	20
Selenium	59	62.8	104	59	62.9	105	0	1.3	20
Silver	29.5	28.7	97	29.5	28.7	97	0	0.23 JD3	20
Vanadium	59	93.7	110	59	93.6	110	0	28.9	20
Zinc	59	118	86	59	140	123	17	67.7	20

Table 2-18. Sediment Method 6020 MS/MSD Recoveries Sample 100213197

Analyte	MS Sample ID: 100213197			MSD Sample ID: 100213197			RPD	Lab Sample Result (mg/kg)	Max RPD
	Spike (mg/kg)	MS Result (mg/kg)	Recovery (%)	Spike (mg/kg)	MSD Result (mg/kg)	Recovery (%)			
Aluminum	1060	13600	395	1060	13400	377	1	9410 P6	20
Antimony	106	75.7	64	106	76.3	64	1	7.8 M0	20
Arsenic	106	112	98	106	112	98	0	8.4	20
Barium	106	333	109	106	354	128	6	218 M0	20
Cadmium	106	114	98	106	118	102	3	9.5	20
Chromium	106	225	104	106	254	132	12	114 M0	20
Copper	106	377	113	106	388	123	3	257	20
Iron	1060	23500	154	1060	24700	266	5	21900 P6	20
Lead	106	464	90	106	430	58	8	368 M0	20
Manganese	106	513	131	106	489	108	5	374 M0	20
Nickel	106	161	91	106	171	100	6	64.1	20
Selenium	106	111	101	106	113	103	2	3.1	20
Silver	53.1	54.9	95	53.1	55.4	96	1	4.4	20
Vanadium	106	123	99	106	124	100	1	17.4	20
Zinc	106	952	54	106	956	57	0	895 P6	20

Table 2-19. Water Method 6020 MS Recoveries

<i>Sample ID</i>	<i>Analyte</i>	<i>Spike (µg/L)</i>	<i>MS Result (µg/L)</i>	<i>Recovery (%)</i>	<i>Lab Sample Result (µg/L)</i>
082713024	Arsenic	12.5	11.16	86	0.35 J B
	Barium	625	605.4	97	0.70 J
	Beryllium	12.5	11.41	91	0.092 U
	Cadmium	12.5	11.39	91	0.066 J
	Chromium	25.0	24.38	98	0.11 U
	Copper	25.0	24.41	96	0.49 J
	Lead	12.5	12.57	99	0.23 J
	Nickel	25.0	24.46	98	0.63 U
	Silver	12.5	11.88	95	0.014 U
	Zinc	25.0	23.15	90	0.74 J
	Selenium	12.5	10.26 ^ F	73	1.1 J ^ B
082913126	Arsenic	12.5	10.61	85	0.092 U
	Barium	625	595.7	95	1.0 J
	Beryllium	12.5	11.63	93	0.092 U
	Cadmium	12.5	11.55	92	0.046 U
	Chromium	25.0	25.06	98	0.49 J B
	Copper	25.0	24.77	96	0.76 J
	Lead	12.5	12.01	95	0.13 J B
	Nickel	25.0	24.18	97	0.63 U
	Selenium	12.5	10.37 ^ F	73	1.2 J ^ B
	Silver	12.5	14.82	119	0.014 U
	Zinc	25.0	23.17	83	2.5 J B
090313180	Arsenic	25.0	22.12	88	0.092 U
	Barium	1250	1190	95	0.93 J
	Beryllium	25.0	23.35	93	0.092 U
	Cadmium	25.0	23.44	94	0.046 U
	Chromium	50.0	52.01	104	0.23 J
	Copper	50.0	51.39	102	0.52 J B
	Lead	25.0	25.96	103	0.12 J
	Nickel	50.0	51.49	103	0.63 U
	Selenium	25.0	21.98	88	0.32 U
	Silver	25.0	23.69	95	0.014 U
	Zinc	50.0	49.90	96	2.1 J B
090513233	Arsenic	25.0	21.73	86	0.32 J
	Barium	1250	1239	98	9.9 J B
	Beryllium	25.0	23.46	94	0.092 U

<i>Sample ID</i>	<i>Analyte</i>	<i>Spike (µg/L)</i>	<i>MS Result (µg/L)</i>	<i>Recovery (%)</i>	<i>Lab Sample Result (µg/L)</i>
	Cadmium	25.0	23.78	95	0.082 J
	Chromium	50.0	57.11	108	3.2 J
	Copper	50.0	55.41	103	4.0 J
	Lead	25.0	30.03	109	2.9 B
	Nickel	50.0	55.09	104	2.9 J
	Selenium	25.0	20.90	84	0.32 U
	Silver	25.0	24.48	98	0.030 J
	Zinc	50.0	61.10	104	9.0 J B
091213472	Arsenic	25.0	22.47	90	0.092 U
	Barium	1250	1198	96	1.7 J
	Beryllium	25.0	23.77	95	0.092 U
	Cadmium	25.0	23.98	96	0.046 U
	Chromium	50.0	52.66	105	0.38 J
	Copper	50.0	54.12	107	0.80 J
	Lead	25.0	27.44	99	2.6
	Nickel	50.0	51.74	102	0.91 J
	Selenium	25.0	22.24	89	0.32 U
	Silver	25.0	24.43	98	0.014 U
	Zinc	50.0	52.78	99	3.2 J B
092613047	Arsenic	25.0	26.36	105	0.11 J
	Barium	1250	1312	105	4.0 J
	Beryllium	25.0	27.14	109	0.092 U
	Cadmium	25.0	26.67	107	0.046 U
	Chromium	50.0	57.93	112	2.1 J B
	Copper	50.0	56.49	109	1.9 J B
	Lead	25.0	27.88	108	0.82 J B
	Nickel	50.0	55.27	108	1.3 J
	Selenium	25.0	24.51	98	0.32 U
	Silver	25.0	29.93	120	0.014 U
	Zinc	50.0	59.10	108	4.9 J B
100113139	Arsenic	25.0	24.74	97	0.41 J B
	Barium	1250	1262	101	5.6 J B
	Beryllium	25.0	25.87	103	0.092 U
	Cadmium	25.0	26.16	105	0.046 U
	Chromium	50.0	56.28	106	3.0 J
100113139	Copper	50.0	52.11	101	1.6 J
	Lead	25.0	27.29	103	1.6 J B
	Nickel	50.0	54.63	107	1.2 J

<i>Sample ID</i>	<i>Analyte</i>	<i>Spike (µg/L)</i>	<i>MS Result (µg/L)</i>	<i>Recovery (%)</i>	<i>Lab Sample Result (µg/L)</i>
	Selenium	25.0	22.33	89	0.32 U
	Silver	25.0	25.10	100	0.024 J
	Zinc	50.0	49.53	86	6.7 J B
100313237	Arsenic	25.0	25.60	102	0.092 U
	Barium	1250	1311	105	2.5 J B
	Beryllium	25.0	26.97	108	0.092 U
	Cadmium	25.0	26.13	105	0.046 U
	Chromium	50.0	53.33	106	0.27 J B
	Copper	50.0	54.14	107	0.49 J
	Lead	25.0	27.58	110	0.074 J
	Nickel	50.0	54.28	109	0.63 U
	Silver	25.0	26.76	107	0.014 U
	Selenium	25.0	22.94	92	0.32 U
	Zinc	50.0	51.51 ^	101	0.78 J B ^

Table 2-20. Sediment Method 7471 MS/MSD Recoveries

<i>Sample ID</i>	<i>Analyte</i>	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Rec (%)</i>	<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
082613003	Mercury	.41	1.7	-2	.41	1.3	-115	30	1.7 P6, R1	20
082713075	Mercury	.2	0.26	83	.2	0.41	152	42	0.094 M0, R1	20
082813097	Mercury	.36	4.7	244	.36	4.3	108	11	3.9 P6	20
090313183	Mercury	.43	4.1	513	.43	1.5	-101	91	1.9 P6, R1	20
090513236	Mercury	.38	4.6	906	.38	2	222	80	1.1 P6, R1	20
090613298	Mercury	.4	2.2	198	.4	2.8	355	24	1.5 P6, R1	20
090913332	Mercury	.21	0.26	114	.21	0.22	96	16	0.033	20
091013399	Mercury	.4	2.4	-537	.4	3.2	-316	31	4.5 P6, R1	20
091113424	Mercury	.3	0.96	130	.3	1.1	166	11	0.56 M0	20
091213474	Mercury	.44	2.7	79	.44	2.9	141	9	2.3 P6	20
091713590	Mercury	.39	1.9	-2	.39	2.3	121	22	3.4	20
091613566	Mercury	.2	0.24	95	.2	0.32	133	27	0.054 M0, R1	20
091813657	Mercury	.39	3.1	173	.39	2.6	48	17	2.5 P6	20
091913713	Mercury	.2	0.23	103	.2	0.23	105	1	0.027	20
092313758	Mercury	.19	0.23	88	.19	0.23	88	1	0.058	20
092413814	Mercury	.43	8.9	1870	.43	1.8	181	133	1.0 M0, R1	20
092513017	Mercury	.37	4.2	-341	.37	4.5	-262	7	5.4 P6	20
092613050	Mercury	.37	4.4	-49	.37	4.1	-147	8	4.6 P6	20
092713101	Mercury	.31	5.7	-3610	.31	5.4	-3700	7	17.1 P6	20
100113158	Mercury	.21	0.25	92	.21	0.3	114	16	0.065	20
100213178	Mercury	.2	0.24	107	.2	0.23	104	2	0.030	20
100213197	Mercury	.36	1.2	42	.36	1.2	69	8	1.0 M0	20

Table 2-21. Water Method 7470 MS Recoveries

<i>Sample ID</i>	<i>Analyte</i>	<i>Spike (µg/L)</i>	<i>MS Result (µg/L)</i>	<i>Recovery (%)</i>	<i>Lab Sample Result (µg/L)</i>
082613001	Mercury	1.00	1.03	94	0.088 J B
082813083	Mercury	1.00	1.11	111	0.050 U
091313524	Mercury	1.00	0.947	88	0.065 J
092313732	Mercury	1.00	0.879	88	0.050 U
093013131	Mercury	1.00	1.07	97	0.10 J

Table 2-22. Sediment Method 9012 MS/MSD Recoveries

<i>Analyte</i>	<i>Sample ID</i>	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Rec (%)</i>	<i>Spike (mg/kg)</i>	<i>MSD Result (mg/kg)</i>	<i>Rec (%)</i>	<i>RPD</i>	<i>Lab Sample Result (mg/kg)</i>	<i>Max RPD</i>
Cyanide	082613003	5.1	4.7	77	5.1	4.3	69	9	0.89 JM0	20
Cyanide	082713073	4.5	6.1	18	4.5	14.2	197	80	5.3 M3, R2	20
Cyanide	082713076	2.7	1.6	52	2.7	2.1	73	31	0.17 UM0, R1	20
Cyanide	082813097	8.4	40.2	141	8.4	28.1	-3	35	28.4 M3, R2	20
Cyanide	082913147	4.4	4.4	86	4.4	4.3	82	3	0.67 J	20
Cyanide	090313183	2.8	2.7	90	2.8	3.1	104	14	1.7 J	20
Cyanide	090513236	7	7.7	92	7	7	83	9	1.2 J	20
Cyanide	090613298	9.5	9.8	73	9.5	10.9	85	11	2.9 M0	20
Cyanide	090913332	2.9	2.8	90	2.9	3	97	6	0.22 J	20
Cyanide	090913357	4.2	4.2	82	4.2	4.1	80	2	0.73 J	20
Cyanide	091013396	2.4	2.7	98	2.4	2.5	88	9	0.29 J	20
Cyanide	091013399	7.6	8.2	87	7.6	6.6	65	22	1.7 M0, R1	20
Cyanide	091113450	6.2	5.2	69	6.2	5.9	81	13	0.89 JM0	20
Cyanide	091213473	5.8	5.9	85	5.8	5.8	82	2	1.0 J	20
Cyanide	091213474	9.8	10.7	92	9.8	10.8	93	1	1.9 J	20
Cyanide	091713612	2.9	2.7	91	2.9	2.6	88	3	0.18 U	20
Cyanide	091713631	2.6	2.3	82	2.6	2	70	16	0.17 UM0	20
Cyanide	091813657	5.3	5.7	49	5.3	6.8	70	18	3.1 M0	20
Cyanide	091813676	8.9	9.1	84	8.9	9	83	1	1.5 J	20
Cyanide	091913713	3.5	3.1	83	3.5	3.3	90	8	0.23 JB	20
Cyanide	091913730	3.2	2.8	78	3.2	1.1	27	84	0.24 JB, M0, R1	20
Cyanide	092313758	3.7	3.8	81	3.7	3.8	80	0	0.79	20
Cyanide	092413776	8.6	8.7	91	8.6	8.2	86	5	0.74 J	20
Cyanide	092413814	9.7	9.8	94	9.7	10.6	103	8	0.81 J	20
Cyanide	092513017	9.3	9.4	55	9.3	10.6	69	12	4.3 M0	20
Cyanide	092613049	6.2	12.3	-29	6.2	10.3	-60	17	14.1 M3	20
Cyanide	092713101	4	4.7	43	4	4.2	29	12	3.0 M0	20
Cyanide	092713128	2.7	2.6	94	2.7	2.5	91	4	0.17 U	20
Cyanide	100113158	4.3	4.1	90	4.3	3.7	81	10	0.27 U	20
Cyanide	100213178	3.1	2.9	91	3.1	3.6	95	22	0.21 UR1	20
Cyanide	100213181	5.1	4.6	59	5.1	6.2	64	29	0.21 U	20
Cyanide	100313238	10.2	11.2	89	10.2	14.6	122	26	2.1 M0, R1	20
Cyanide	100313251	4.2	3.7	89	4.2	3.8	91	3	0.26 U	20

Table 2-23. Sediment Lloyd Kahn TOC MS Recoveries

<i>Analyte</i>	<i>Sample ID</i>	<i>Spike (mg/kg)</i>	<i>MS Result (mg/kg)</i>	<i>Recovery (%)</i>	<i>Lab Sample Result (mg/kg)</i>
Total Organic Carbon	082613003	35000	126200 F	73	101000 B
Total Organic Carbon	091013399	35000	144300	95	111000 B
Total Organic Carbon	091213474	35000	138200	80	110000 B
Total Organic Carbon	091713590	35000	156700 F	73	131000
Total Organic Carbon	091913713	35000	75130	84	45600 B
Total Organic Carbon	092413814	35000	136300	90	105000 B
Total Organic Carbon	092313758	35000	75840	84	46500 ^
Total Organic Carbon	092713101	35000	161200 F	186	96000 B

2.7 ICP/MS Serial Dilutions

Serial dilution tests were performed by the laboratory on an analytical batch basis.

All serial dilution tests met the acceptance criterion defined in the test method for all of the metals with the exception of 100313231 which failed for vanadium at 13.2%. Vanadium results in SDG 4086154 will be qualified with results that are >MDL as estimated ("J"), non-detects as estimated ("UJ").

2.8 TOC Quadruplicate Analysis

According to the Lloyd Kahn method one in every 20 samples in a batch should be run in quadruplicate, and meet a criteria of less than 3 standard deviations. The lab ran what appears to be every sample in quadruplicate. Many of the samples that did not meet the 3 SD were rerun, our calculated through a Dixon outlier test. The following sample did not meet this criteria and were reported; 091213488, 092713096, and 092713097. Results for these samples will be qualified as estimated ("J").

2.9 Field Duplicates

Field duplicates were collected and analyzed for all of the inorganic parameters. Field duplicates generally show excellent agreement for all of the analytes where the values are above the sample quantitation limit. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs.

Criteria for evaluating field duplicate precision is provided in the Multi-Site QAPP Addendum dated March 12, 2012. Worksheet #28 of that addendum defines and upper limit of 30% RPD for precision between field duplicate values for inorganic parameters.

For the inorganic field duplicates, multiple sample results exceeded 30% RPD. Based upon the RPD values, sample results for failed elements and duplicate samples will be qualified as estimated ("J").

The results of the duplicate analyses are given in Tables 2-24 through 2-28.

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary

Analyte	Sample ID: 082613004			Sample ID: 082613023			RPD	Sample ID: 082813099			Sample ID: 082813106			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Arsenic	8.1		1.9	8.5		2.1	4.8	10.2		1.1	9.2		1.1	10.3
Barium	278		1.9	281		2.1	1.1	41.7		1.1	48.3		1.1	14.7
Beryllium	0.73	JD3	1.9	0.79	JD3	2.1	7.9	0.86	JD3	1.1	0.93	JD3	1.1	7.8
Cadmium	10.5		1.9	10.2		2.1	2.9	0.58	JD3	1.1	1.6		1.1	93.6
Chromium	124		1.9	131		2.1	5.5	27.1		1.1	32.0		1.1	16.6
Copper	274		1.9	292		2.1	6.4	33.6		1.1	34.1		1.1	1.5
Lead	306		1.9	317		2.1	3.5	19.6		1.1	24.4		1.1	21.8
Nickel	55.7		1.9	55.0		2.1	1.3	37.5		1.1	37.2		1.1	0.8
Selenium	3.4		1.9	3.7		2.1	8.5	2.1		1.1	1.8		1.1	15.4
Silver	11.3		0.96	10.9		1.0	3.6	0.26	JD3	0.54	0.25	JD3	0.55	3.9
Zinc	927		38.5	968		41.4	4.3	69.5		21.7	85.6		21.8	20.8

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 1

<i>Analyte</i>	<i>Sample ID: 090913333</i>			<i>Sample ID: 090913334</i>			<i>RPD</i>	<i>Sample ID: 090513243</i>			<i>Sample ID: 090513251</i>			<i>RPD</i>
	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>		<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	
Arsenic	10		1.2	9.7		1.1	3.0	12.1		2.1	13.0		2.0	7.2
Barium	51.3		1.2	57.6		1.1	11.6	426		2.1	406		2.0	4.8
Beryllium	0.85	JD3	1.2	0.74	JD3	1.1	13.8	1.1	JD3	2.1	0.86	JD3	2.0	24.5
Cadmium	0.20	JD3	1.2	0.26	JD3	1.1	26.1	78.0		2.1	74.4		2.0	4.7
Chromium	26.2		1.2	26.3		1.1	0.4	705		2.1	734		2.0	4.0
Copper	29.2		1.2	28.2		1.1	3.5	594		2.1	575		2.0	3.3
Lead	15.8		1.2	16.3		1.1	3.1	1020		2.1	979		2.0	4.1
Nickel	34.6		1.2	33.4		1.1	3.5	230		2.1	220		2.0	4.4
Selenium	1.9		1.2	1.6		1.1	17.1	3.8		2.1	3.3		2.0	14.1
Silver	0.054	JD3	0.58	0.065	JD3	0.55	18.5	28.8		1.0	26.9		1.0	6.8
Zinc	54.0		23.1	56.4		21.9	4.3	2020		41.2	1910		39.9	5.6

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 2

<i>Analyte</i>	<i>Sample ID: 090913363</i>			<i>Sample ID: 091013421</i>			<i>RPD</i>	<i>Sample ID: 091213475</i>			<i>Sample ID: 091213486</i>			<i>RPD</i>
	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>		<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	
Arsenic	10.5		1.9	11.2		2.3	6.5	10.0		2.4	10.3		2.4	3.0
Barium	339		1.9	446		2.3	27.3	351		2.4	389		2.4	10.3
Beryllium	0.79	JD3	1.9	0.91	JD3	2.3	14.1	0.98	JD3	2.4	1.0	JD3	2.4	2.0
Cadmium	74.5		1.9	64.5		2.3	14.4	54.8		2.4	52.9		2.4	3.5
Chromium	565		1.9	551		2.3	2.5	306		2.4	343		2.4	11.4
Copper	458		1.9	555		2.3	19.2	404		2.4	453		2.4	11.4
Lead	665		1.9	911		2.3	31.2	470		2.4	546		2.4	15.0
Nickel	166		1.9	243		2.3	37.7	156		2.4	190		2.4	19.7
Selenium	2.9		1.9	3.5		2.3	18.8	3.8		2.4	3.4		2.4	11.1
Silver	22.8		0.95	29.0		1.1	23.9	23.9		1.2	26.6		1.2	10.7
Zinc	1750		37.9	1940		45.3	10.3	1540		47.1	1670		47.2	8.1

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 2

<i>Analyte</i>	<i>Sample ID: 091713588</i>			<i>Sample ID: 091713594</i>			<i>RPD</i>	<i>Sample ID: 091813671</i>			<i>Sample ID: 091813674</i>			<i>RPD</i>
	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>		<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	
Arsenic	15.9		2.0	14.7		1.8	7.8	40.4		1.6	44.7		1.9	10.1
Barium	479		2.0	458		1.8	4.5	579		1.6	795		1.9	31.4
Beryllium	1.0	JD3	2.0	0.90	JD3	1.8	10.5	1.1	JD3	1.6	1.3	JD3	1.9	16.7
Cadmium	180		2.0	122		1.8	38.4	78.6		1.6	95.6		1.9	19.5
Chromium	805		2.0	734		1.8	9.2	1720		1.6	1960		1.9	13.0
Copper	661		2.0	600		1.8	9.7	589		1.6	615		1.9	4.3
Lead	1140		2.0	1050		1.8	8.2	886		1.6	1320		1.9	39.3
Nickel	202		2.0	234		1.8	14.7	128		1.6	117		1.9	9.0
Selenium	3.4		2.0	3.2		1.8	6.1	4.1		1.6	4.4		1.9	7.1
Silver	28.6		1.0	25.0		0.90	13.4	15.0		0.81	15.3		0.94	2.0
Zinc	2830		40.3	2440		36.0	14.8	2610		32.4	2780		37.6	6.3

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 3

Analyte	Sample ID: 092313751			Sample ID: 092313760			RPD	Sample ID: 092413815			Sample ID: 092413827			RPD
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ		Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Arsenic	9.2		2.1	8.7		2.2	5.6	7.5		2.1	8.1		2.3	7.7
Barium	329		2.1	328		2.2	0.3	258		2.1	277		2.3	7.1
Beryllium	0.72	JD3	2.1	0.60	JD3	2.2	18.2	0.64	JD3	2.1	0.71	JD3	2.3	10.4
Cadmium	32.6		2.1	35.4		2.2	8.2	10		2.1	9.9		2.3	1.0
Chromium	257		2.1	259		2.2	0.8	114		2.1	122		2.3	6.8
Copper	348		2.1	415		2.2	17.6	264		2.1	272		2.3	3.0
Lead	363		2.1	353		2.2	2.8	264		2.1	269		2.3	1.9
Nickel	112		2.1	109		2.2	2.7	55.4		2.1	53.7		2.3	3.1
Selenium	3.3		2.1	3.1		2.2	6.2	2.5		2.1	2.8		2.3	11.3
Silver	23.0		1.0	23.5		1.1	2.2	18.3		1.0	12.3		1.1	39.2
Zinc	1220		41.6	1240		43.4	1.6	831		41.2	913		45.8	9.4

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 4

<i>Analyte</i>	<i>Sample ID: 090313204</i>			<i>Sample ID: 090313209</i>			<i>RPD</i>	<i>Sample ID: 091913701</i>			<i>Sample ID: 091913716</i>			<i>RPD</i>
	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>		<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	
Arsenic	12.0		1.1	12.5		1.2	4.1	10.1		2.1	9.7		1.9	4.0
Barium	39.1		1.1	48		1.2	20.4	409		2.1	379		1.9	7.6
Beryllium	0.60	JD3	1.1	0.79	JD3	1.2	27.3	0.78	JD3	2.1	0.72	JD3	1.9	8.0
Cadmium	0.93	JD3	1.1	0.23	JD3	1.2	120.7	55.3		2.1	46.0		1.9	18.4
Chromium	24.2		1.1	26.4		1.2	8.7	381		2.1	321		1.9	17.1
Copper	34.0		1.1	37.9		1.2	10.8	497		2.1	462		1.9	7.3
Lead	19.7		1.1	19.3			2.1	688		2.1	614		1.9	11.4
Nickel	34.1		1.1	37.0		1.2	8.2	214		2.1	183		1.9	15.6
Selenium	2.0		1.1	1.9		1.2	5.1	3.1		2.1	2.9		1.9	6.7
Silver	0.13	JD3	0.53	0.097	JB, D3	0.59	29.1	22.6		1.0	22.5		0.97	0.4
Zinc	67.1		21.3	58.5	M0	23.4	13.7	1740		41.3	1610		38.6	7.8

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 5

<i>Analyte</i>	<i>Sample ID: 092513018</i>			<i>Sample ID: 092513031</i>			<i>RPD</i>	<i>Sample ID: 092713114</i>			<i>Sample ID: 092713118</i>			<i>RPD</i>
	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>		<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	
Aluminum	13700		482	14000		547	2.2	11300		503	11000		459	2.7
Antimony	4.8		1.9	5.4		2.2	11.8	5.1		2.0	5.0		1.8	2.0
Arsenic	18.5		1.9	18.9		2.2	2.1	24.7		2.0	24.8		1.8	0.4
Barium	525		1.9	554		2.2	5.4	542		2.0	523		1.8	3.6
Cadmium	66.7		1.9	58.0		2.2	14.0	91.4		2.0	94.1		1.8	2.9
Chromium	735		1.9	670		2.2	9.3	1140		2.0	1150		1.8	0.9
Copper	544		1.9	490		2.2	10.4	581		2.0	578		1.8	0.5
Iron	23300		482	25300		547	8.2	23000		503	21500		459	6.7
Lead	946		1.9	972		2.2	2.7	1020		2.0	865		1.8	16.4
Manganese	266		1.9	284		2.2	6.5	251		2.0	245		1.8	2.4
Nickel	218		1.9	215		2.2	1.4	223		2.0	217		1.8	2.7
Selenium	4.1		1.9	3.7		2.2	10.3	3.8		2.0	3.6		1.8	5.4
Silver	22.8		0.96	21.8		1.1	4.5	16.3		1.0	18.3		0.92	11.6
Vanadium	14.2		1.9	18.6		2.2	26.8	68.9		2.0	68.7		1.8	0.3
Zinc	2570		38.6	2750		43.8	6.8	2530		40.2	2400		36.7	5.3

Table 2-24. Sediment Method 6020 Field Duplicates Results Summary Cont 6

<i>Analyte</i>	<i>Sample ID: 100213198</i>			<i>Sample ID: 100213212</i>			<i>RPD</i>
	Result (mg/kg)	Lab Flag	LOQ	Result (mg/kg)	Lab Flag	LOQ	
Aluminum	11700		471	11200		490	4.4
Antimony	3.0		1.9	4.0		2.0	28.6
Arsenic	16.2		1.9	15.6		2.0	3.8
Barium	418		1.9	492		2.0	16.3
Cadmium	50.5		1.9	56.4		2.0	11.0
Chromium	565		1.9	659		2.0	15.4
Copper	414		1.9	461		2.0	10.7
Iron	22500		471	23700		490	5.2
Lead	738		1.9	895		2.0	19.2
Manganese	291		1.9	302		2.0	3.7
Nickel	150		1.9	204		2.0	30.5
Selenium	2.7		1.9	3.0		2.0	10.5
Silver	14.3		0.94	15.5		0.98	8.1
Vanadium	47.6		1.9	50.6		2.0	6.1
Zinc	1970		37.7	2250		39.2	13.3

Table 2-25. Sediment Method 7471 Field Duplicates Results Summary

<i>Analyte</i>	<i>Original Sample</i>	<i>Sample IDs</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>RPD</i>
Mercury	FD082613004	082613004	1.3		0.14	
		082613023	1.2		0.13	8.0
	FD082813099	082813099	0.029		0.0079	
		082813106	0.020		0.0070	36.7
	FD090513243	090513243	4.8		0.27	
		090513251	2.5		0.24	63.0
	FD090913333	090913333	0.024		0.0077	
		090913334	0.026		0.0071	8.0
	FD091013363	090913363	2.4		0.25	
		091013421	2.4		0.27	0.0
	FD091213475	091213475	2.1		0.27	
		091213486	2.2		0.30	4.7
	FD091713588	091713588	3.8		0.25	
		091713594	3.7		0.25	2.7
	FD091813671	091813671	10		0.23	
		091813674	10.4		0.21	3.9
	FD091913701	091913701	2.8		0.27	
		091913716	3.1		0.28	10.2
	FD092313751	092313751	3.2		0.28	
		092313760	1.5		0.28	72.3
	FD092413815	092413815	1.3		0.23	
		092413827	1.4		0.24	7.4
	FD092513018	092513018	5.2		0.27	
		092513031	4.8		0.28	8.0
	FD092713114	092713114	9.2		0.24	
		092713118	15.5		2.3	51.0
	FD100213198	100213198	4.3		0.23	
		100213212	2.9		0.28	38.9

Table 2-26. Sediment 9012 Field Duplicates Results Summary

<i>Analyte</i>	<i>Original Sample</i>	<i>Sample IDs</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>RPD</i>
Cyanide	FD082613004	082613004	0.86	J	1.2	
		082613023	0.98	J	1.2	13.0
	FD082813099	082813099	0.27	J	0.69	
		082813106	0.25	U	0.81	NC
	FD090513243	090513243	14.0		1.6	
		090513251	3.8		1.7	114.6
	FD090913333	090913333	0.53	J	0.77	
		090913334	0.24	U	0.77	NC
	FD091013363	090913363	0.97	J	1.1	
		091013421	3.4		1.2	111.2
	FD091213475	091213475	3.0		2.1	
		091213486	2.5		1.3	18.2
	FD091713588	091713588	4.8		0.76	
		091713594	9.1		0.95	61.9
	FD091813671	091813671	3.4		0.99	
		091813674	5.5		1.0	47.2
	FD091913701	091913701	3.0		0.75	
		091913716	2.5	B	1.6	18.2
	FD092313751	092313751	2.0		1.2	
		092313760	1.3	J	1.4	42.4
	FD092413815	092413815	0.83	J	1.1	
		092413827	1.3	J	1.8	44.1
	FD092513018	092513018	3.4		2.0	
		092513031	3.2		1.5	6.1
FD092713114	092713114	3.1		1.4		
	092713118	3.4		1.2	9.2	
FD100213198	100213198	2.9	B	1.1		
	100213212	3.5	B	1.6	18.8	

Table 2-27. Sediment Lloyd Kahn TOC Field Duplicates Results Summary

<i>Analyte</i>	<i>Original Sample</i>	<i>Sample IDs</i>	<i>Result (mg/kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>RPD</i>
Total Organic Carbon	FD082613004	082613004	105000	^ B	1000	
		082613023	111000	B	1000	5.6
	FD082813099	082813099	45400	B	1000	
		082813106	46900	B	1000	3.3
	FD090313204	090313204	47100	B	1000	
		090313209	47200	B	1000	0.2
	FD090513243	090513243	118000	B	1000	
		090513251	118000	B	1000	0.0
	FD090913333	090913333	41600	B	1000	
		090913334	93300	B	1000	76.6
	FD091013363	090913363	88800		1000	
		091013421	120000		1000	29.9
	FD091213475	091213475	107000	B	1000	
		091213486	108000	B	1000	0.9
	FD091713588	091713588	127000	B	1000	
		091713594	118000	B	1000	7.3
	FD091813671	091813671	156000		1000	
		091813674	161000		1000	3.2
	FD091913701	091913701	116000	B	1000	
		091913716	166000	B	1000	35.5
	FD092313751	092313751	96100	^	1000	
		092313760	102000	^	1000	6.0
	FD092413815	092413815	103000	B	1000	
		092413827	101000	B	1000	2.0
	FD092513018	092513018	151000	B	1000	
		092513031	158000	B	1000	4.5
	FD092713114	092713114	108000	B	1000	
		092713118	144000	B	1000	28.6
	FD100213198	100213198	185000		1000	
		100213212	133000	B	1000	32.7

Table 2-28. Percent Moisture Field Duplicates Results Summary

Analyte	Sample ID: 082613004			Sample ID: 082613023			RPD	Sample ID: 082813099			Sample ID: 082813106			RPD
	Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ		Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ	
Percent Moisture	45.6		0.25	44.6		0.25	2.2	92.1		0.25	72.7		0.25	23.5
	55.5		0.10	57.5		0.10	3.5	17.3		0.10	18.0		0.10	4.0

Table 2-28. Percent Moisture Field Duplicates Results Summary Cont 1

Analyte	Sample ID: 090313204			Sample ID: 090313209			RPD	Sample ID: 090513243			Sample ID: 090513251			RPD
	Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ		Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ	
Percent Moisture	85.2		0.25	84.3		0.25	1.1	45.9		0.25	45.9		0.25	0.0
	15.7		0.10	15.4		0.1	1.9	55.3		0.10	54.8		0.10	0.9

Table 2-28. Percent Moisture Field Duplicates Results Summary Cont 2

Analyte	Sample ID: 090913333			Sample ID: 090913334			RPD	Sample ID: 090913363			Sample ID: 091013421			RPD
	Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ		Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ	
Percent Moisture	84.7		0.25	53.1		0.25	45.9	50.8		0.25	42.8		0.25	17.1
	17.7		0.10	17.7		0.10	0.0	51.1		0.10	58.5		0.10	13.5

Table 2-28. Percent Moisture Field Duplicates Results Summary Cont 2

Analyte	Sample ID: 091713588			Sample ID: 091713594			RPD	Sample ID: 091813671			Sample ID: 091813674			RPD
	Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ		Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ	
Percent Moisture	48.3		0.25	48.6		0.25	0.6	48.0		0.25	47.6		0.25	0.8
	52.4		0.10	51.2		0.10	2.3	47.1		0.10	51.9		0.10	9.7

Table 2-28. Percent Moisture Field Duplicates Results Summary Cont 3

Analyte	Sample ID: 091213475			Sample ID: 091213486			RPD	Sample ID: 091913701			Sample ID: 091913716			RPD
	Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ		Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ	
Percent Moisture	43.3		0.25	42.4		0.25	2.1	49.7		0.25	44.9		0.25	10.1
	58.5		0.10	62.3		0.10	6.3	56.9		0.10	55.1		0.10	3.2

Table 2-28. Percent Moisture Field Duplicates Results Summary Cont 4

Analyte	Sample ID: 092313751			Sample ID: 092313760			RPD	Sample ID: 092413815			Sample ID: 092413827			RPD
	Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ		Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ	
Percent Moisture	48.5		0.25	49.4		0.25	1.8	43.5		0.25	44.5		0.25	2.3
	57.4		0.10	57.0		0.10	0.7	55.8		0.10	58.5		0.10	4.7

Table 2-28. Percent Moisture Field Duplicates Results Summary Cont 5

Analyte	Sample ID: 092713114			Sample ID: 092713118			RPD	Sample ID: 100213198			Sample ID: 100213212			RPD
	Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ		Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ	
Percent Moisture	46.7		0.25	45.9		0.25	1.7	43.6		0.25	43.9		0.25	0.7
	55.2		0.10	52.4		0.10	5.2	54.6		0.10	56.1		0.10	2.7

Table 2-28. Percent Moisture Field Duplicates Results Summary Cont 6

Analyte	Sample ID: 092513018			Sample ID: 092513031			RPD
	Result (%)	Lab Flag	LOQ	Result (%)	Lab Flag	LOQ	
Percent Moisture	44.3		0.25	44.1		0.25	0.5
	56.4		0.10	56.6		0.10	0.4

3.0 ORGANIC DATA REVIEW

Blank, spiked, and duplicate results were provided. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples. Ottawa sand was used as the matrix for VOC method blank analysis for sediment samples and organic free water was used as the method blank for water samples. Sodium sulfate was used as the matrix for method blanks for the semivolatile organics (PNAs, PCBs, Phenols, and SVOCs) analyses for the sediment samples and organic free water was used as the method blank for water samples.

Sediment samples were analyzed for organic compounds following SW-846 Methods or laboratory developed methods as shown in Table 3-1.

Table 3-1. Organic Analytes and Methods Summary

<i>Analytical Method</i>	<i>Analyte</i>
EPA 8260B	Purgeable Volatile Organic Compounds (PVOC)
EPA 8270C	Semivolatile Organic Compounds (SVOC)
EPA 8270C-SIM	Polycyclic Aromatic Hydrocarbons (PAHs)
EPA 8082	PCBs
Alkylated PAH by SIM	Alkylated PAHs

3.1 SW-846 Method 8260B – Purgeable Volatile Organic Compounds

3.1.1 Summary

SW-846 Method 8260B employs gas chromatographic separation with a mass spectrometer as a detector.

3.1.2 Method Blanks

The sediment samples were analyzed in 32 analytical batches for sediments. The aqueous samples (trip blanks) were analyzed in 11 analytical batches. One batch had toluene with positive value above the limit of detection but below the reporting limit. Sample 91713612 will be qualified as estimated ("J"). All other sample results in this batch were "ND" or more than ten times the level of contamination.

The method blank data are summarized in Tables 3-2 and 3-3.

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg)

<i>Analyte</i>	<i>QC Batch: 139091</i>	<i>QC Batch: 139092</i>	<i>QC Batch: 139494</i>	<i>QC Batch: 139645</i>	<i>QC Batch: 139648</i>	<i>QC Batch: 139793</i>	<i>QC Batch: 140300</i>	<i>QC Batch: 140482</i>	<i>QC Batch: 140507</i>
1,2,4-Trimethylbenzene	9.5 U								
1,3,5-Trimethylbenzene	13.4 U								
Benzene	7.3 U								
Ethylbenzene	8.9 U								
Toluene	15.5 U								
Xylene (Total)	39.2 U								

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg) Cont 1

<i>Analyte</i>	<i>QC Batch: 140622</i>	<i>QC Batch: 140783</i>	<i>QC Batch: 140912</i>	<i>QC Batch: 141220</i>	<i>QC Batch: 141260</i>	<i>QC Batch: 141527</i>	<i>QC Batch: 141601</i>	<i>QC Batch: 141607</i>	<i>QC Batch: 141757</i>
1,2,4-Trimethylbenzene	9.5 U								
1,3,5-Trimethylbenzene	13.4 U								
Benzene	7.3 U								
Ethylbenzene	8.9 U								
Toluene	15.5 U	16.0 J	15.5 U	15.5 U					
Xylene (Total)	39.2 U								

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg) Cont 2

<i>Analyte</i>	<i>QC Batch: 141758</i>	<i>QC Batch: 141868</i>	<i>QC Batch: 142249</i>	<i>QC Batch: 142350</i>	<i>QC Batch: 142537</i>	<i>QC Batch: 142834</i>	<i>QC Batch: 142837</i>	<i>QC Batch: 142921</i>	<i>QC Batch: 143297</i>
1,2,4-Trimethylbenzene	9.5 U								
1,3,5-Trimethylbenzene	13.4 U								
Benzene	7.3 U								
Ethylbenzene	8.9 U								
Toluene	15.5 U								
Xylene (Total)	39.2 U								

Table 3-2. Sediment Method 8260 Method Blank Results Summary (µg/Kg) Cont 3

<i>Analyte</i>	<i>QC Batch: 143303</i>	<i>QC Batch: 143454</i>	<i>QC Batch: 143461</i>	<i>QC Batch: 143686</i>	<i>QC Batch: 143693</i>
1,2,4-Trimethylbenzene	9.5 U				
1,3,5-Trimethylbenzene	13.4 U				
Benzene	7.3 U				
Ethylbenzene	8.9 U				
Toluene	15.5 U				
Xylene (Total)	39.2 U				

Table 3-3. Water Method 8260 Method Blank Results Summary (µg/L)

<i>Analyte</i>	<i>QC Batch: 200- 60762</i>	<i>QC Batch: 200- 60818</i>	<i>QC Batch: 200- 60881</i>	<i>QC Batch: 200- 61158</i>	<i>QC Batch: 200- 61237</i>	<i>QC Batch: 200- 61327</i>
1,2,4-Trimethylbenzene	0.20 U					
1,3,5-Trimethylbenzene	0.18 U					
Benzene	0.17 U					
Ethylbenzene	0.18 U					
m&p-Xylene	0.36 U					
o-Xylene	0.17 U					
Toluene	0.17 U					
Xylene (Total)	0.17 U					

Table 3-3. Water Method 8260 Method Blank Results Summary (µg/L) Cont

<i>Analyte</i>	<i>QC Batch: 200- 61487</i>	<i>QC Batch: 200- 61772</i>	<i>QC Batch: 200- 62074</i>	<i>QC Batch: 200- 62154</i>	<i>QC Batch: 200- 62405</i>
1,2,4-Trimethylbenzene	0.20 U				
1,3,5-Trimethylbenzene	0.18 U				
Benzene	0.17 U				
Ethylbenzene	0.18 U				
m&p-Xylene	0.36 U				
o-Xylene	0.17 U				
Toluene	0.17 U				
Xylene (Total)	0.17 U				

3.1.3 Trip Blanks, Field Blanks, Equipment Blanks

Twelve trip blanks were provided with this sample set. None of the trip blanks associated with these samples gave results above the detection limit.

Twenty seven equipment blanks were also collected and submitted for analysis. Three of the equipment blanks associated with these samples gave low level results above the detection limit but below the reporting limit for all analytes except for benzene and toluene. The associated sediment sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a "U". Results that are above the reporting limit, but less than five times the reporting limit, will be qualified as estimated ("J") due to the low levels of the results. Results more than five times the reporting limit will not be qualified.

3.1.4 Calibration

All initial calibration criteria were met for all compounds. All analytes fit first order linear regression curves and gave average response factors (RFs) with <15% RSD over the average. Therefore average RFs were used in sample quantitation. No data are qualified as a result of the initial calibration data.

For evaluating calibration verifications, the June 2008 CLP National Functional Guidelines have established a $\pm 40\%$ drift or difference acceptability criterion for analytes known to exhibit poor response and a $\pm 25\%$ drift or difference criterion for all other target analytes. None of the analytes of concern in this investigation are considered to exhibit poor response. The calibration verification associated with this data set did not exceed the $\pm 25\%$ difference criterion in place for all other target analytes. Consequently, no data are qualified as a result of the calibration verification data.

3.1.5 Surrogate Compound Recoveries

Three surrogate compounds, 4-bromofluorobenzene, toluene- d_8 , and dibromofluoromethane were spiked into each field sample to monitor analyte recovery in the analytical system. The surrogates used by the laboratory are acceptable to measure recovery under EPA SW-846 guidance for this analytical method.

In some cases surrogate compound recoveries are not within specified recovery range due to sample dilution as a consequence of high analyte concentrations or high amounts of non-target analytes present in the samples. In these cases, the laboratory appended their "S4" or "D3" qualifier to indicate dilution as the cause for the low recovery. Sample dilution, when warranted, is not cause to further qualify sample results.

Thirty-five other sediment samples gave recoveries below limits used by the laboratory. These were qualified with an "S1" flag by the laboratory. In these cases the failed recovery is not associated with a sample dilution. For these samples, positive results are qualified as estimated ("J") and non-detects as ("UJ").

Recoveries for all surrogates for all samples are presented in Tables 3-4 and 3-5.

Table 3-4. Sediment Method 8260 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Dilution	4-Bromofluorobenzene		Dibromofluoromethane		Toluene-d8	
			Limits:	49	130	57	130	54
4083785001	082613002	1	47	S1	53	S1	54	
4083785002	082613003	1	65		67		70	
4083785003	082613004	1	48	S1	58		56	
4083785004	082613015	8	51		64	D3	57	
4083785005	082613016	1	48	S1	63		56	
4083785006	082613017	1	67		74		74	
4083785007	082613018	1	80		91		89	
4083785008	082613023	1	44	S1	56	S1	52	S1
4083785009	082713025	1	48	S1	55	S1	56	
4083785010	082713026	1	51		64		57	
4083785011	082713027	1	44	S1	63		56	
4083785012	082713043	1	55		72		67	
4083785013	082713044	1	73		80		81	
4083785014	082713045	1	75		85		85	
4083785015	082713048	1	73		81		80	
4083785018	082713052	1	44	S1	53	S1	51	S1
4083785019	082713053	1	51		62		60	
4083785020	082713054	1	60		72		72	
4083785021	082713073	1	58		69		64	
4083785022	082713074	1	70		84		80	
4083785023	082713075	1	77		89		90	
4083785024	082713076	1	79		91		89	
4083977001	082813084	1	53		73		62	
4083977002	082813085	1	52		77		64	
4083977003	082813086	1	53		77		63	
4083977004	082813096	1	52		80		61	
4083977005	082813097	1	54		77		67	
4083977006	082813098	1	54		74		63	
4083977007	082813099	1	78		97		87	

Lab Sample Number	Field ID	Dilution	4-Bromofluorobenzene		Dibromofluoromethane		Toluene-d8	
4083977009	082813106	1	70		99		81	
4083977010	082813107	1	56		74		65	
4083977011	082813108	1	55		79		65	
4083977012	082813109	1	53		77		64	
4083977013	082913127	1	63		86		74	
4083977014	082913128	1	58		82		69	
4083977015	082913129	1	57		83		66	
4083977016	082913140	1	65		87		74	
4083977017	082913141	4	80		99		89	
4083977018	082913142	1	83		87		93	
4083977019	082913147	1	93		98		104	
4084169001	083013150	1	50		63		62	
4084169002	083013151	1	45	S1	52	S1	52	S1
4084169003	083013152	1	64		74		75	
4084169004	083013159	1	65		70		74	
4084169005	083013167	1	53		59		61	
4084169006	083013168	1	70		69		78	
4084169007	083013169	1	60		67		69	
4084169008	083013175	1	82		84		92	
4084169009	090313182	1	55		61		63	
4084169010	090313183	1	51		57		61	
4084169011	090313184	1	60		65		71	
4084169012	090313201	200	0	S4	0	D3, S4	0	S4
4084169013	090313204	1	74		83		78	
4084310001	090513234	1	48	S1	53	S1	55	
4084310002	090513235	1	52		57		60	
4084310003	090513236	1	51		57		59	
4084310004	090513241	1	54		62		62	
4084310005	090513242	1	56		64		65	
4084310006	090513243	1	60		65		68	
4084310007	090513250	1	85		86		94	
4084310008	090513251	1	60		66		69	
4084310009	090513252	1	47	S1	51	S1	52	S1
4084310010	090513253	1	52		56	S1	59	
4084310011	090513254	1	57		66		66	
4084310012	090513257	1	61		66		68	
4084310013	090513265	1	82		87		92	
4084310014	090513269	1	53		58		60	
4084310015	090513270	1	60		75		71	

Lab Sample Number	Field ID	Dilution	4-Bromofluorobenzene		Dibromofluoromethane		Toluene-d8	
4084310016	090513271	1	52		64		61	
4084310017	090513274	1	54		60		63	
4084310018	090513281	1	78		82		87	
4084566001	090613283	1	55		57		56	
4084566002	090613284	1	52		54	S1	57	
4084566003	090613285	1	50		56	S0	52	S0
4084566004	090613292	1	56		58		58	
4084566005	090613293	1	87		83		87	
4084566006	090613294	1	86		85		88	
4084566007	090613297	1	51		59		58	
4084566008	090613298	1	54		58		57	
4084566009	090613299	1	55		59		59	
4084566010	090613310	1	54		56	S1	58	
4084566011	090613311	1	61		61		63	
4084566012	090613312	1	61		62		65	
4084566013	090613313	1	57		59		59	
4084566014	090613318	1	88		86		90	
4084566015	090613319	1	90		83		91	
4084566016	090913323	1	56		58		60	
4084566017	090913324	1	59		64		63	
4084566018	090913325	1	59		60		61	
4084566019	090913332	20	0	S4	0	D3, S4	0	S4
4084566020	090913333	1	79		83		84	
4084566021	090913334	1	65		66		66	
4084566022	090913335	1	68		73		74	
4084566023	090913336	1	74		79		80	
4084566024	090913337	1	75		81		81	
4084566025	090913344	4	89		86		92	
4084566026	090913345	1	89		86		91	
4084566027	090913346	1	61		64		63	
4084566028	090913347	1	58		62		63	
4084566029	090913348	1	60		63		64	
4084566030	090913357	2	84		90	D3	93	
4084566031	090913358	1	76		79		81	
4084566032	090913359	1	83		85		89	
4084566033	090913361	1	76		79		82	
4084566034	090913362	1	73		76		79	
4084566035	090913363	1	72		76		79	
4084566036	091013373	1	76		75		77	

Lab Sample Number	Field ID	Dilution	4-Bromofluorobenzene		Dibromofluoromethane		Toluene-d8	
4084566037	091013374	1	81		83		83	
4084566038	091013375	1	69		70		73	
4084566039	091013395	2.5	94		86		92	
4084566040	091013396	10	97		83	D3	106	
4084566041	091013397	1	109		103		120	
4084566042	091013398	1	61		65		69	
4084566043	091013399	1	58		62		65	
4084566044	091013400	1	54		60		61	
4084566045	091013418	4	85		82	D3	103	
4084566046	091013419	1	98		92		107	
4084566047	091013421	1	65		69		74	
4084784001	091113424	1	63		57		67	
4084784002	091113425	1	58		59		63	
4084784003	091113426	1	51		49	S1	57	
4084784004	091113430	20	0	S4	0	D3, S4	0	S4
4084784005	091113431	1	52		53	S1	55	
4084784006	091113432	4	79		73		83	
4084784007	091113437	1	56		54	S1	61	
4084784008	091113438	1	52		54	S1	59	
4084784009	091113439	1	49		49	S1	56	
4084784010	091113450	1	50		52	S1	58	
4084784011	091113451	1	60		57		65	
4084784012	091113452	1	55		59		64	
4084784013	091113460	1	94		86		98	
4084784014	091113461	1	68		66		75	
4084784015	091113462	1	82		77		89	
4084784016	091113463	1	69		69		76	
4084784017	091113466	20	0	S4	0	D3, S4	0	S4
4084784018	091113467	1	94		92		104	
4084784019	091113468	1	98		89		99	
4084784020	091213473	1	66		66		74	
4084784021	091213474	1	67		66		72	
4084784022	091213475	1	60		60		67	
4084784023	091213486	1	67		63		69	
4084784024	091213487	1	81		71		81	
4084784025	091213488	1	68		61		68	
4084784026	091213489	1	95		81		97	
4084784027	091213495	4	102		80		94	
4084784028	091213496	1	89		82		93	

Lab Sample Number	Field ID	Dilution	4-Bromofluorobenzene		Dibromofluoromethane		Toluene-d8	
4084784029	091213497	1	86		81		93	
4084784030	091213498	1	82		78		87	
4084784031	091213499	1	81		80		85	
4084784032	091213500	1	86		84		93	
4084784033	091213509	1	74		75		83	
4084784034	091213510	1	79		76		87	
4084784035	091213511	1	83		76		86	
4084784036	091213518	200	0	S4	0	D3, S4	0	S4
4084784037	091213519	50	0	S4	0	D3, S4	0	S4
4084784038	091213520	1	81		82		89	
4085044001	091613545	1	67		66		72	
4085044002	091613548	1	81		80		87	
4085044003	091613553	1	79		74		83	
4085044004	091613554	1	93		87		99	
4085044005	091613555	1	72		68		78	
4085044006	091613564	200	0	S4	0	D3, S4	0	S4
4085044007	091613565	2	78		79		82	
4085044008	091613566	1	81		80		86	
4085044009	091713569	1	66		73		73	
4085044010	091713570	1	69		73		73	
4085044011	091713571	1	61		69		66	
4085044012	091713587	1	62		71		67	
4085044013	091713590	1	59		65		59	
4085044014	091713591	1	84		84		86	
4085044015	091713592	1	80		86		83	
4085044016	091713594	1	59		66		63	
4085044017	091713588	1	58		69		62	
4085044018	091713595	1	69		77		73	
4085044019	091713596	1	67		74		73	
4085044020	091713597	1	64		67		66	
4085044021	091713609	1	72		80		81	
4085044022	091713611	1	93		91		94	
4085044023	091713612	1	85		82		85	
4085044024	091713613	1	74		70		76	
4085044026	091713615	1	58		67		67	
4085044027	091713616	1	63		67		72	
4085044028	091713617	1	75		80		86	
4085044029	091713629	1	61		73		72	
4085044030	091713630	1	71		80		79	

Lab Sample Number	Field ID	Dilution	4-Bromofluorobenzene		Dibromofluoromethane		Toluene-d8	
4085044031	091713631	1	73		81		91	
4085230001	091813637	1	48	2q	55	1q, 2q	53	2q
4085230002	091813638	1	66		71		71	
4085230003	091813639	1	61		69		66	
4085230004	091813649	1	53		64		60	
4085230005	091813650	1	86		92		94	
4085230006	091813651	1	80		83		86	
4085230008	091813655	1	62		66		67	
4085230009	091813656	1	57		64		60	
4085230010	091813657	1	72		72		73	
4085230011	091813671	2	62		69	D3	65	
4085230012	091813672	1	80		83		85	
4085230013	091813673	1	82		89		85	
4085230014	091813674	1	52		65		61	
4085230015	091813675	1	73		76		78	
4085230016	091813676	1	73		74		77	
4085230017	091813677	1	86		85		89	
4085230018	091813686	1	87		91		93	
4085230019	091813687	1	87		86		91	
4085230020	091813688	1	62		65		67	
4085230021	091813689	1	77		81		80	
4085230022	091813690	1	69		72		74	
4085230023	091813693	10	80		85	D3	81	
4085230024	091813694	20	0	S4	0	D3, S4	0	S4
4085230025	091813695	1	91		95		95	
4085230026	091913699	1	88		87		89	
4085230027	091913700	1	76		75		81	
4085230028	091913701	1	82		81		84	
4085230029	091913712	50	0	S4	0	D3, S4	0	S4
4085230030	091913713	1	86		90		93	
4085230031	091913714	1	89		87		93	
4085230032	091913716	1	80		80		85	
4085230033	091913717	1	66		66		69	
4085230034	091913718	1	82		81		87	
4085230035	091913719	1	73		74		76	
4085230036	091913730	50	0	S4	0	D3, S4	0	S4
4085483001	092313734	1	72		76		78	
4085483002	092313735	1	74		76		79	
4085483003	092313736	1	70		78		75	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>4-Bromofluorobenzene</i>		<i>Dibromofluoromethane</i>		<i>Toluene-d8</i>	
4085483004	092313741	1	72		77		73	
4085483005	092313742	1	68		74		72	
4085483006	092313743	1	69		74		71	
4085483007	092313747	1	91		95		94	
4085483008	092313749	1	81		86		84	
4085483009	092313750	1	91		93		96	
4085483010	092313751	1	86		89		92	
4085483011	092313758	1	96		93		99	
4085483012	092313760	1	86		86		88	
4085483013	092313759	1	94		97		99	
4085483014	092313761	1	60		62		64	
4085483015	092313762	1	67		73		73	
4085483016	092313763	1	72		75		79	
4085483017	092313772	1	69		76		79	
4085483018	092313773	2.5	73		72	D3	85	
4085483019	092313774	1	81		87		92	
4085483020	092413776	1	66		71		76	
4085483021	092413777	1	67		69		76	
4085483022	092413778	1	68		71		79	
4085483023	092413797	1	84		86		94	
4085483024	092413798	2	83		81	D3	95	
4085483025	092413799	1	63		65		73	
4085483026	092413800	1	72		73		80	
4085483027	092413801	1	78		77		86	
4085483028	092413809	1	83		85		93	
4085483029	092413810	1	81		85		92	
4085483030	092413811	1	81		83		91	
4085483031	092413813	1	64		66		75	
4085483032	092413814	1	68		73		77	
4085483033	092413815	1	70		67		69	
4085483034	092413824	2.5	82		77	D3	82	
4085483035	092413825	1	89		90		88	
4085483036	092413827	1	77		74		77	
4085729001	092513001	1	68		77		78	
4085729002	092513002	1	48	S1	62		59	
4085729003	092513003	1	70		75		80	
4085729004	092513009	1	69		75		79	
4085729005	092513010	1	88		84		85	
4085729006	092513016	1	52		60		54	

Lab Sample Number	Field ID	Dilution	4-Bromofluorobenzene		Dibromofluoromethane		Toluene-d8	
4085729007	092513017	1	50		61		56	
4085729008	092513018	1	50		62		54	
4085729009	092513022	40	0	S4	0	D3, S4	0	S4
4085729010	092513027	80	0	S4	0	D3, S4	0	S4
4085729011	092513028	1	80		87		81	
4085729012	092513031	1	49		62		53	S1
4085729013	092513032	1	56		65		62	
4085729014	092513033	1	50		59		53	S1
4085729015	092513034	1	47	S1	58		51	S1
4085729016	092513040	1	51		60		55	
4085729017	092513044	8	85		89	D3	80	
4085729018	092513045	1	79		85		81	
4085729019	092613048	1	52		54	S1	53	S1
4085729020	092613049	1	45	S1	57		47	S1
4085729021	092613050	1	56		61		58	
4085729022	092613065	20	0	S4	0	D3, S4	0	S4
4085729023	092613067	1	96		95		92	
4085729024	092613071	1	56		63		57	
4085729025	092613072	1	69		70		70	
4085729026	092613073	1	60		65		62	
4085729027	092613086	2	73		75	D3	73	
4085729028	092613088	1	94		92		92	
4085983001	092713095	1	59		68		69	
4085983002	092713096	1	70		77		80	
4085983003	092713097	1	52		62		62	
4085983004	092713101	1	58		61		59	
4085983005	092713107	1	86		90		96	
4085983006	092713110	1	54		63		62	
4085983007	092713114	1	59		67		69	
4085983008	092713115	1	61		69		69	
4085983009	092713116	2	81		79	D3	90	
4085983010	092713118	1	54		60		62	
4085983011	092713119	1	44	S1	57		55	
4085983012	092713121	1	51		60		61	
4085983013	092713127	2	69		67	D3	77	
4085983014	092713128	1	81		87		91	
4085983015	100113140	1	69		71		77	
4085983016	100113141	1	61		63		62	
4085983017	100113142	1	63		64		65	

Lab Sample Number	Field ID	Dilution	4-Bromofluorobenzene		Dibromofluoromethane		Toluene-d8	
4085983018	100113147	1	65		67		66	
4085983019	100113155	1	72		69		70	
4085983020	100113156	1	75		71		74	
4085983021	100113158	1	88		87		84	
4086154001	100213166	1	59		57		59	
4086154002	100213167	1	68		72		70	
4086154003	100213168	1	66		67		67	
4086154004	100213172	200	0	S4	0	D3, S4	0	S4
4086154005	100213178	1	79		85		81	
4086154006	100213181	1	79		86		84	
4086154007	100213182	1	64		67		70	
4086154008	100213183	1	82		74		75	
4086154009	100213184	1	80		75		74	
4086154010	100213191	400	0	S4	0	D3, S4	0	S4
4086154011	100213193	4	86		79		80	
4086154012	100213194	5	79		76		74	
4086154013	100213196	1	61		55	6q	57	
4086154014	100213197	1	58		63		66	
4086154015	100213198	1	48	S1	52	S1	49	S1
4086154016	100213209	40	0	S4	0	D3, S4	0	S4
4086154017	100213210	1	78		78		76	
4086154018	100213212	1	49		55	6q	48	6q
4086154019	100313213	1	60		59		59	
4086154020	100313214	1	44	6q	44	6q	42	6q
4086154021	100313215	1	51		55	6q	54	
4086154022	100313231	1	56		63		62	
4086154023	100313236	1	85		90		95	
4086154024	100313238	1	50		59		59	
4086154025	100313239	1	48	S1	57		54	
4086154026	100313240	1	53		61		62	
4086154027	100313249	2	52		53	7q, D3	58	
4086154028	100313251	1	76		82		88	
4086154028	100313251	1	76		82		88	

Table 3-5. Water Method 8260 Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	1,2-Dichlorobenzene-d4		1,2-Dichloroethane-d4		Bromofluorobenzene		Toluene-d8	
			Limits:	75	120	80	120	80	125	80
200-18170-1	082613001	1	102		105		104		99	
200-18170-2	082713024	1	102		102		102		99	
200-18170-25	TRIP BLANK 01	1	103		103		102		100	
200-18273-19	082813083	1	105		104		106		99	
200-18273-20	082913126	1	103		101		103		98	
200-18273-21	083013148	1	104		102		104		100	
200-18312-15	083013149	1	106		103		105		99	
200-18312-16	090313180	1	104		103		103		100	
200-18312-17	090313181	1	104		106		104		102	
200-18336-1	090413210	1	105		109		106		101	
200-18336-2	090413211	1	104		107		104		100	
200-18336-3	090513233	1	106		106		106		101	
200-18393-1	090613282	1	106		104		106		101	
200-18393-2	090613296	1	107		105		107		100	
200-18393-3	090913322	1	106		108		106		102	
200-18393-4	091013372	1	105		103		107		101	
200-18438-1	091113422	1	104		107		106		100	
200-18438-2	091113423	1	105		106		105		99	
200-18438-3	091213472	1	105		103		107		99	
200-18503-1	091313524	1	104		102		106		100	
200-18503-2	091313525	1	105		104		107		99	
200-18503-3	091613539	1	106		104		106		98	
200-18503-4	091713568	1	106		106		107		100	
200-18545-1	091813636	1	105		101		108		100	
200-18545-2	091913697	1	104		105		103		103	
200-18545-3	091913698	1	104		103		105		98	
200-18620-1	092313732	1	101		97		102		96	
200-18620-2	092313733	1	102		98		104		99	
200-18620-3	092413775	1	99		96		100		94	
200-18668-1	092513828	1	107		105		107		101	
200-18668-2	092613047	1	107		105		106		101	
200-18754-1	092713094	1	105		101		105		100	
200-18754-2	093013131	1	104		101		105		100	
200-18754-3	093013132	1	104		99		103		98	
200-18754-4	100113139	1	104		102		104		100	
200-18810-1	100213164	1	107		106		106		101	
200-18810-2	100213165	1	103		100		102		100	
200-18810-3	100313237	1	102		100		102		98	

3.1.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed for multiple samples as specified by the project team in accordance with the Sampling and Analysis Plan. The spike solution used by the laboratory does not contain 1,2,4-Trimethylbenzene or 1,3,5-Trimethylbenzene. Therefore there are no spike results for the LCS or MS/MSD for these analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The MS/MSD results are summarized in Table 3-6.

Table 3-6. Sediment Method 8260 MS/MSD Recoveries

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
082613003	Benzene	6020	5790	96	6020	6550	109	12	17.6 U	20
	Ethylbenzene	6020	5630	94	6020	6120	102	8	21.3 U	20
	Toluene	6020	5480	90	6020	6050	99	10	55.2 J	20
	Xylene (Total)	18100	16800	93	18100	18100	100	7	94.6 U	20
082813097	Benzene	5230	4630	87	5230	4450	84	4	46.4	20
	Ethylbenzene	5230	3840	73	5230	3510	66	9	39.5 J	20
	Toluene	5230	4300	78	5230	3890	70	10	238	20
	Xylene (Total)	15700	11700	72	15700	10600	65	10	428	20
090313183	Benzene	6260	5600	90	6260	5980	96	6	18.2 U	20
	Ethylbenzene	6260	5730	92	6260	6170	99	7	22.2 U	20
	Toluene	6260	6060	96	6260	6420	101	6	79.7 J	20
	Xylene (Total)	18800	17300	92	18800	18600	99	7	98.3 U	20
090513236	Benzene	5870	4530	77	5870	4680	80	3	17.1 U	20
	Ethylbenzene	5870	4600	78	5870	4610	79	0	20.8 U	20
	Toluene	5870	4850	81	5870	4900	82	1	104 J	20
	Xylene (Total)	17600	14000	79	17600	14100	80	1	92.2 U	20
090613298	Benzene	5930	4240	72	5930	4460	75	5	18.0 U	20
	Ethylbenzene	5930	4940	83	5930	5020	85	2	21.9 U	20
	Toluene	5930	4970	82	5930	4990	83	0	96.5 J	20
	Xylene (Total)	17800	14400	81	17800	14800	83	3	96.9 U	20
091013399	Benzene	5930	5830	98	5930	5930	100	2	17.3 U	20
	Ethylbenzene	5930	6050	102	5930	6350	107	5	21.0 U	20

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
	Toluene	5930	6170	102	5930	6410	106	4	142	20
	Xylene (Total)	17800	17600	99	17800	18600	104	5	93.1 U	20
091213474	Benzene	6420	4550	71	6420	5230	82	14	18.7 U	20
	Ethylbenzene	6420	4350	68	6420	5290	82	19	22.7 U	20
	Toluene	6420	4600	70	6420	5510	84	18	93.4 J	20
	Xylene (Total)	19200	12900	67	19200	15900	82	21	101 URS	20
091813657	Benzene	8890	8500	96	8890	9330	97	9	16.8 U	20
	Ethylbenzene	8890	7670	86	8890	8390	87	9	27.6 J	20
	Toluene	8890	7910	87	8890	8610	87	8	211 B	20
	Xylene (Total)	26600	22300	83	26600	24600	84	10	233 J	20
091913713	Benzene	4520	4830	-93	4520	5700	-75	17	9020 M1	20
	Ethylbenzene	4520	3940	86	4520	3700	83	6	53.6 J	20
	Toluene	4520	3910	87	4520	3680	84	6	34.8 U	20
	Xylene (Total)	13600	10900	80	13600	10700	81	2	87.9 U	20
091813637	Benzene	6340	4350	69	6340	4250	67	2	18.5 U	20
	Ethylbenzene	6340	3640	57	6340	3360	53	8	22.4 U	20
	Toluene	6340	4090	63	6340	3720	57	9	101 J	20
	Xylene (Total)	19000	10600	56	19000	9690	51	9	99.5 U	20
092313758	Benzene	3620	4220	106	3620	5760	114	31	398 R1	20
	Ethylbenzene	3620	3690	102	3620	4710	100	24	17.3 UR1	20
	Toluene	3620	3560	97	3620	4570	96	25	48.2 JR1	20
	Xylene (Total)	10800	10800	100	10800	14000	98	25	76.6 U	20
092413814	Benzene	10800	7530	70	10800	6960	71	8	29.8 U	20
	Ethylbenzene	10800	7870	73	10800	7360	75	7	36.3 U	20
	Toluene	10800	8060	73	10800	7450	74	8	251	20
	Xylene (Total)	32300	23700	73	32300	22000	75	8	161 U	20
092513017	Benzene	5420	3330	59	5420	3400	61	2	116	20
	Ethylbenzene	5420	2360	42	5420	2560	46	8	72.6 J	20
	Toluene	5420	2870	44	5420	3140	49	9	467	20
	Xylene (Total)	16300	6720	40	16300	7120	42	6	216 J	20
092713101	Benzene	4800	4270	73	4800	4250	72	1	788	20
	Ethylbenzene	4800	3310	58	4800	3530	63	6	512	20
	Toluene	4800	3220	62	4800	3150	60	2	270	20
	Xylene (Total)	14400	8980	54	14400	9410	57	5	1170	20
100213178	Benzene	2950	2710	92	2950	2780	94	3	8.6 U	20
	Ethylbenzene	2950	2270	75	2950	2560	85	12	63.2	20
	Toluene	2950	2210	75	2950	2310	78	4	18.3 U	20
	Xylene (Total)	8850	6370	71	8850	6830	77	7	51.3 J	20

3.1.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed on each day of analysis and for each analytical batch. None of the analytes recovered outside of the acceptance limits established by the laboratory. The spike solution used by the laboratory does not contain 1,2,4-Trimethylbenzene or 1,3,5-Trimethylbenzene. Therefore there are no spike results for the LCS or MS/MSD for these analytes. No data are qualified due to failed LCS recoveries. The LCS results are summarized in Tables 3-7 and 3-8.

Table 3-7. Sediment Method 8260 LCS Results

Analyte	Rec Limits (%)		QC Batch: 139091			QC Batch: 139092			QC Batch: 139494		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2560	102	2500	2640	106	2500	3000	120
Ethylbenzene	65	137	2500	2340	93	2500	2430	97	2500	2480	99
Toluene	70	130	2500	2290	91	2500	2520	101	2500	2460	98
Xylene (Total)	65	138	7500	6980	93	7500	7250	97	7500	7430	99

Table 3-7. Sediment Method 8260 LCS Results Cont 1

Analyte	Rec Limits (%)		QC Batch: 139645			QC Batch: 139648			QC Batch: 139793		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2570	103	2500	2710	109	2500	2560	102
Ethylbenzene	65	137	2500	2570	103	2500	2620	105	2500	2580	103
Toluene	70	130	2500	2660	106	2500	2510	100	2500	2630	105
Xylene (Total)	65	138	7500	7760	103	7500	7500	100	7500	7680	102

Table 3-7. Sediment Method 8260 LCS Results Cont 2

Analyte	Rec Limits (%)		QC Batch: 140300			QC Batch: 140482			QC Batch: 140507		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2280	91	2500	2560	103	2500	2620	105
Ethylbenzene	65	137	2500	2590	104	2500	2750	110	2500	2620	105
Toluene	70	130	2500	2610	105	2500	2680	107	2500	2620	105
Xylene (Total)	65	138	7500	7620	102	7500	8190	109	7500	7850	105

Table 3-7. Sediment Method 8260 LCS Results Cont 3

Analyte	Rec Limits (%)		QC Batch: 140622			QC Batch: 140783			QC Batch: 140912		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2620	105	2500	2510	100	2500	2210	88
Ethylbenzene	65	137	2500	2650	106	2500	2700	108	2500	2300	92
Toluene	70	130	2500	2650	106	2500	2640	106	2500	2310	92
Xylene (Total)	65	138	7500	8480	113	7500	7860	105	7500	6800	91

Table 3-7. Sediment Method 8260 LCS Results Cont 4

Analyte	Rec Limits (%)		QC Batch: 141220			QC Batch: 141260			QC Batch: 141527		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2570	103	2500	2610	105	2500	2940	117
Ethylbenzene	65	137	2500	2760	111	2500	2780	111	2500	2690	108
Toluene	70	130	2500	2660	106	2500	2690	107	2500	2670	107
Xylene (Total)	65	138	7500	7960	106	7500	8120	108	7500	8120	108

Table 3-7. Sediment Method 8260 LCS Results Cont 5

Analyte	Rec Limits (%)		QC Batch: 141601			QC Batch: 141607			QC Batch: 141757		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	3170	127	2500	2930	117	2500	3030	121
Ethylbenzene	65	137	2500	2980	119	2500	2760	111	2500	2830	113
Toluene	70	130	2500	2880	115	2500	2690	108	2500	2760	111
Xylene (Total)	65	138	7500	8690	116	7500	8070	108	7500	8280	110

Table 3-7. Sediment Method 8260 LCS Results Cont 6

Analyte	Rec Limits (%)		QC Batch: 141758			QC Batch: 141868			QC Batch: 142249		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2930	117	2500	2490	100	2500	2730	109
Ethylbenzene	65	137	2500	2780	111	2500	2670	107	2500	2620	105
Toluene	70	130	2500	2740	109	2500	2660	106	2500	2570	103
Xylene (Total)	65	138	7500	8300	111	7500	8110	108	7500	7680	102

Table 3-7. Sediment Method 8260 LCS Results Cont 7

Analyte	Rec Limits (%)		QC Batch: 142350			QC Batch: 142537			QC Batch: 142834		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2510	100	2500	2870	115	2500	3120	125
Ethylbenzene	65	137	2500	2600	104	2500	2740	110	2500	2960	118
Toluene	70	130	2500	2630	105	2500	2640	105	2500	2870	115
Xylene (Total)	65	138	7500	8010	107	7500	7940	106	7500	8540	114

Table 3-7. Sediment Method 8260 LCS Results Cont 8

Analyte	Rec Limits (%)		QC Batch: 142837			QC Batch: 142921			QC Batch: 143297		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2380	95	2500	2490	99	2500	3020	121
Ethylbenzene	65	137	2500	2550	102	2500	2340	93	2500	2820	113
Toluene	70	130	2500	2530	101	2500	2300	92	2500	2720	109
Xylene (Total)	65	138	7500	7800	104	7500	6840	91	7500	8100	108

Table 3-7. Sediment Method 8260 LCS Results Cont 9

Analyte	Rec Limits (%)		QC Batch: 143303			QC Batch: 143454			QC Batch: 143461		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
Benzene	70	130	2500	2500	100	2500	2840	114	2500	2350	94
Ethylbenzene	65	137	2500	2650	106	2500	2590	104	2500	2580	103
Toluene	70	130	2500	2650	106	2500	2460	98	2500	2560	103
Xylene (Total)	65	138	7500	8150	109	7500	7460	99	7500	7900	105

Table 3-7. Sediment Method 8260 LCS Results Cont 10

Analyte	Rec Limits (%)		QC Batch: 143686			QC Batch: 143693		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Benzene	70	130	2500	2840	114	2500	2350	94
Ethylbenzene	65	137	2500	2590	104	2500	2580	103
Toluene	70	130	2500	2460	98	2500	2560	103
Xylene (Total)	65	138	7500	7460	99	7500	7900	105

Table 3-8. Water Method 8260 LCS Summary

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 200-60762</i>			<i>QC Batch: 200-60818</i>			<i>QC Batch: 200-60881</i>		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	25.6	102	25.0	26.0	104	25.0	26.9	107
1,3,5-Trimethylbenzene	80	120	25.0	25.7	103	25.0	26.1	104	25.0	26.8	107
Benzene	80	125	25.0	25.5	102	25.0	25.3	101	25.0	26.4	106
Ethylbenzene	80	125	25.0	25.9	103	25.0	26.0	104	25.0	26.7	107
m&p-Xylene	80	125	50.0	51.1	102	50.0	51.6	103	50.0	52.9	106
o-Xylene	80	120	25.0	25.7	103	25.0	25.8	103	25.0	26.5	106
Toluene	80	120	25.0	25.9	103	25.0	26.3	105	25.0	26.9	108

Table 3-8. Water Method 8260 LCS Summary Cont 1

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 200-61158</i>			<i>QC Batch: 200-61237</i>			<i>QC Batch: 200-61327</i>		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	25.4	101	25.0	26.3	105	25.0	26.3	105
1,3,5-Trimethylbenzene	80	120	25.0	25.3	101	25.0	26.2	105	25.0	26.2	105
Benzene	80	125	25.0	26.0	104	25.0	25.7	103	25.0	25.8	103
Ethylbenzene	80	125	25.0	26.1	104	25.0	26.2	105	25.0	26.2	105
m&p-Xylene	80	125	50.0	52.6	105	50.0	52.3	105	50.0	51.8	104
o-Xylene	80	120	25.0	25.8	103	25.0	25.9	104	25.0	25.9	104
Toluene	80	120	25.0	26.7	107	25.0	26.6	107	25.0	26.5	106

Table 3-8. Water Method 8260 LCS Summary Cont 2

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 200-61487</i>			<i>QC Batch: 200-61772</i>			<i>QC Batch: 200-62074</i>		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
1,2,4-Trimethylbenzene	80	120	25.0	25.6	102	25.0	25.5	102	25.0	25.1	100
1,3,5-Trimethylbenzene	80	120	25.0	25.4	102	25.0	25.6	102	25.0	25.1	100
Benzene	80	125	25.0	25.4	101	25.0	25.7	103	25.0	25.4	102
Ethylbenzene	80	125	25.0	25.6	102	25.0	26.1	105	25.0	25.7	103
m&p-Xylene	80	125	50.0	50.2	100	50.0	50.9	102	50.0	50.7	101
o-Xylene	80	120	25.0	25.2	101	25.0	25.8	103	25.0	25.4	102
Toluene	80	120	25.0	25.5	102	25.0	26.4	106	25.0	26.0	104

Table 3-8. Water Method 8260 LCS Summary Cont 3

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 200-62154</i>			<i>QC Batch: 200-62405</i>		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
1,2,4-Trimethylbenzene	80	120	25.0	24.7	99	25.0	25.7	103
1,3,5-Trimethylbenzene	80	120	25.0	25.5	102	25.0	25.5	102
Benzene	80	125	25.0	25.1	100	25.0	25.6	102
Ethylbenzene	80	125	25.0	26.2	105	25.0	26.1	105
m&p-Xylene	80	125	50.0	51.8	104	50.0	51.8	104
o-Xylene	80	120	25.0	25.7	103	25.0	25.8	103
Toluene	80	120	25.0	26.1	104	25.0	26.1	105

3.1.8 Field Duplicates

Field duplicates generally exhibited good agreement for most of analytes with all RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate “NDs”, however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. Only toluene on samples 092513018 and 092513031 exceed twice the limit of quantitation therefore, these two samples only will be qualified for toluene as estimated (“J”). The results of the field duplicate analyses are given in Table 3-9.

Table 3-9. Sediment Method 8260 Field Duplicate Results

Analyte	Sample ID: 082613004			Sample ID: 082613023			RPD	Sample ID: 082813099			Sample ID: 082813106			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	21.4	U	112	22.4	U	118	0.0	11.5	U	60.4	11.6	U	61.0	0.0
1,3,5-Trimethylbenzene	30.1	U	112	31.5	U	118	0.0	16.2	U	60.4	16.3	U	61.0	0.0
Benzene	16.4	U	45.0	17.1	U	47.0	0.0	23.3	J	24.2	25.0		24.4	7.0
Ethylbenzene	19.9	U	112	20.8	U	118	0.0	10.7	U	60.4	10.8	U	61.0	0.0
Toluene	48.9	J	112	77.1	J	118	44.8	18.8	U	60.4	18.9	U	61.0	0.0
Xylene (Total)	88.3	U	337	92.3	U	353	0.0	47.4	U	181	47.9	U	183	0.0

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 1

Analyte	Sample ID: 090913333			Sample ID: 090913334			RPD	Sample ID: 090913363			Sample ID: 091013421			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	11.6	U	60.8	14.4	J	60.7	NC	42.0	J	102	106	J	120	86.5
1,3,5-Trimethylbenzene	16.3	U	60.8	16.3	U	60.7	0.0	27.4	U	102	43.4	J	120	NC
Benzene	10.3	J	24.3	19.4	J	24.3	61.3	34.9	J	40.9	17.6	U	48.2	NC
Ethylbenzene	38.9	J	60.8	45.6	J	60.7	15.9	50.7	J	102	21.3	U	120	NC
Toluene	18.9	U	60.8	18.9	U	60.7	0.0	76.8	J	102	187		120	83.5
Xylene (Total)	66.7	J	182	47.7	U	182	NC	80.3	U	307	94.5	U	361	0.0

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 2

Analyte	Sample ID: 090513243			Sample ID: 090513251			RPD	Sample ID: 091213475			Sample ID: 091213486			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	283		112	275		111	2.9	66.8	J	120	78.3	J	133	15.9
1,3,5-Trimethylbenzene	128		112	119		111	7.3	32.3	U	120	35.6	U	133	0.0
Benzene	16.3	U	44.7	18.1	J	44.3	NC	17.5	U	48.1	19.3	U	53.1	0.0
Ethylbenzene	24.6	J	112	26.1	J	111	5.9	21.3	U	120	23.5	U	133	0.0
Toluene	96.8	J	112	80.3	J	111	18.6	82.5	J	120	121	J	133	37.8
Xylene (Total)	193	J	336	172	J	332	11.5	94.5	U	361	104	U	398	0.0

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 3

Analyte	Sample ID: 091713588			Sample ID: 091713594			RPD	Sample ID: 091813671			Sample ID: 091813674			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	306		105	327		102	6.6	1050		189	1100		104	4.7
1,3,5-Trimethylbenzene	133		105	125		102	6.2	310		189	340		104	9.2
Benzene	46.7		42.0	40.3	J	41.0	14.7	254		75.7	298		41.6	15.9
Ethylbenzene	34.9	J	105	39.7	J	102	12.9	236		189	250		104	5.8
Toluene	361		105	288		102	22.5	132	J	189	205		104	43.3
Xylene (Total)	434		315	440		307	1.4	637		567	724		312	12.8

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 4

Analyte	Sample ID: 091913701			Sample ID: 091913716			RPD	Sample ID: 092313751			Sample ID: 092313760			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	143	J	190	113	J	149	23.4	100	J	184	81.7	J	179	20.1
1,3,5-Trimethylbenzene	50.9	U	190	39.8	U	149	0.0	49.2	U	184	48.0	U	179	0.0
Benzene	27.7	U	76.0	50.5	J	59.4	NC	26.8	U	73.4	26.1	U	71.6	0.0
Ethylbenzene	33.6	U	190	28.9	J	149	15.0	32.5	U	184	31.7	U	179	0.0
Toluene	195		190	163		149	17.9	164	J	184	170	J	179	3.6
Xylene (Total)	149	U	570	117	U	446	0.0	144	U	551	140	U	537	0.0

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 5

Analyte	Sample ID: 092413815			Sample ID: 092413827			RPD	Sample ID: 092513018			Sample ID: 092513031			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	48.8	J	182	42.6	J	149	13.6	381		115	344		115	10.2
1,3,5-Trimethylbenzene	48.9	U	182	39.8	U	149	0.0	183		115	164		115	11.0
Benzene	26.6	U	72.9	21.7	U	59.5	0.0	73.9		45.8	69.2		46.1	6.6
Ethylbenzene	32.3	U	182	26.3	U	149	0.0	72.3	J	115	66.2	J	115	8.8
Toluene	119	J	182	105	J	149	12.5	497		115	366		115	30.4
Xylene (Total)	143	U	547	117	U	446	0.0	212	J	344	193	J	346	9.4

Table 3-9. Sediment Method 8260 Field Duplicate Results Cont 6

Analyte	Sample ID: 092713114			Sample ID: 092713118			RPD	Sample ID: 100213198			Sample ID: 100213212			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
1,2,4-Trimethylbenzene	851		112	845		105	0.7	225		110	277		114	20.7
1,3,5-Trimethylbenzene	261		112	258		105	1.2	98.8	J	110	109	J	114	9.8
Benzene	213		44.6	204		42.0	4.3	50.0		44.1	54.8		45.6	9.2
Ethylbenzene	114		112	110		105	3.6	37.2	J	110	41.6	J	114	11.2
Toluene	266		112	246		105	7.8	482		110	548		114	12.8
Xylene (Total)	696		335	680		315	2.3	152	J	330	201	J	342	27.8

3.2 SW-846 Method 8270C–Phenols and PAHs

3.2.1 Summary

SW-846 Method 8270C employs gas chromatographic separation with mass spectroscopic identification for the phenolic and polycyclic aromatic hydrocarbon (PAH) compounds of interest.

3.2.2 Method Blanks

The samples were prepared in multiple preparation batches. None of the method blanks associated with these sample analyses showed any contamination for any of the target compounds above the detection limit. Hence, no data are qualified due to method blank contamination.

Note that twenty-seven field blanks were also submitted with these samples. None of the field blanks gave any positive results above the reporting limits. No data are qualified due to field blank contamination.

The results for the method blanks are summarized in Tables 3-10 and 3-11.

Table 3-10. Sediment Method 8270 Method Blank Results Summary (µg/Kg)

Analyte	QC Batch: 140834	QC Batch: 140998	QC Batch: 141168	QC Batch: 141400	QC Batch: 141523	QC Batch: 141553	QC Batch: 141710	QC Batch: 141864	QC Batch: 141940
2,4-Dimethylphenol	83.3 U								
2-Methylphenol(o-Cresol)	83.3 U								
3&4-Methylphenol(m&p Cresol)	17.4 U								
Phenol	19.8 U								

Table 3-10. Sediment Method 8270 Method Blank Results Summary (µg/Kg) Cont 1

Analyte	QC Batch: 142064	QC Batch: 142065	QC Batch: 142219	QC Batch: 142545	QC Batch: 142655	QC Batch: 143020	QC Batch: 203005	QC Batch: 203006
2,4-Dimethylphenol	83.3 U	165 U	165 U					
2-Methylphenol(o-Cresol)	83.3 U	165 U	165 U					
3&4-Methylphenol(m&p Cresol)	17.4 U	330 U	330 U					
Phenol	19.8 U	165 U	165 U					

Table 3-10. Sediment Method 8270 Method Blank Results Summary (µg/Kg) Cont 2

<i>Analyte</i>	<i>QC Batch: 203532</i>	<i>QC Batch: 203531</i>	<i>QC Batch: 141940</i>	<i>QC Batch: 203689</i>	<i>QC Batch: 203690</i>
2,4-Dimethylphenol	165 U	165 U	83.3 U	165 U	165 U
2-Methylphenol(o-Cresol)	165 U	165 U	83.3 U	165 U	165 U
3&4-Methylphenol(m&p Cresol)	330 U	330 U	17.4 U	330 U	330 U
Phenol	165 U	165 U	19.8 U	165 U	165 U

Table 3-11. Water Method 8270 Method Blank Results Summary (µg/L)

<i>Analyte</i>	<i>QC Batch: 200- 61040</i>	<i>QC Batch: 200- 61367</i>	<i>QC Batch: 200- 61426</i>	<i>QC Batch: 200- 61572</i>	<i>QC Batch: 200- 61628</i>	<i>QC Batch: 200- 61869</i>	<i>QC Batch: 200- 62185</i>	<i>QC Batch: 200- 62503</i>	<i>QC Batch: 200- 62934</i>
2,4-Dimethylphenol	0.75 U								
			0.75 U		0.75 U				
			0.75 U						
2-Methylphenol(o-Cresol))	0.51 U								
			0.51 U		0.51 U				
			0.51 U						
3&4-Methylphenol(m&p Cresol)	1.2 U								
			1.2 U		1.2 U				
			1.2 U						
Phenol	0.44 U								
			0.44 U		0.44 U				
			0.44 U						

3.2.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. All reported DFTPP tunes passed the established criteria. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all target analyte results.

All of the initial calibration verification (ICV) and continuing calibration verification (CCV) checks for Method 8270C performed gave acceptable results (i.e., <25% D for most compounds, <40%D for poor performing compounds using the CLP National Functional Guidelines) for all of the target analytes. Consequently, no data are qualified based upon calibration verification results.

3.2.4 Surrogate Compound Recoveries

Three surrogate compounds were spiked into each of the samples.

Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. A few samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Using the guidance from the October 1999 National Functional Guidelines (since the current NFG do not effectively address surrogate compounds), only sample results where at least two surrogate compounds from each fraction (i.e., base/neutral fraction or acid fraction) fail to recover within limits are cause for qualification. Under those conditions only ten samples require qualification of data: samples 090613299, 090612312, 090913335, 091113426, 091113463, 091213475, 091713571, 091813689, 091813690, and 091913700. Positive results for analytes in these samples will be qualified as estimated ("J"). Results for analytes reported as not detected are qualified as not detected with greater uncertainty as to the reporting limit ("UJ"). For sample 090613312 any analytes reported as not detect will be qualified as unusable ("R") since surrogate recoveries are less than ten percent.

The surrogate recoveries for all samples are presented in Tables 3-12 and 3-14.

Table 3-12. Sediment Method 8270 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
		Limits:	18	130	28	130	30	130
4083785001	082613002	1	72		53		60	
4083785002	082613003	1	65		52		49	
4083785003	082613004	1	67		43		49	
4083785004	082613015	8	48		33		43	
4083785005	082613016	5	37		28		32	
4083785006	082613017	1	62		62		58	
4083785007	082613018	1	54		56		54	
4083785008	082613023	1	75		49		56	
4083785009	082713025	10	71		39		55	
4083785010	082713026	5	71		49		42	
4083785011	082713027	5	54		38		40	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2,4,6-Tribromophenol</i>		<i>2-Fluorophenol</i>		<i>Phenol-d₆</i>	
4083785012	082713043	5	51		27	50	30	
4083785013	082713044	1	40		44		47	
4083785014	082713045	1	43		43		44	
4083785015	082713048	1	49		50		58	
4083785018	082713052	1	61		53		49	
4083785019	082713053	1	68		49		56	
4083785020	082713054	1	59		46		47	
4083785021	082713073	4	41		37		41	
4083785022	082713074	5	46		34		50	
4083785023	082713075	1	64		55		60	
4083785024	082713076	1	48		46		51	
4083977001	082813084	1	43		36		39	
4083977002	082813085	1	49		42		43	
4083977003	082813086	1	66		52		55	
4083977004	082813096	10	36		24	1q, 50	26	1q, 50
4083977005	082813097	2	44		42		42	
4083977006	082813098	8	48		34		47	
4083977007	082813099	1	44		50		65	
4083977009	082813106	1	46		42		62	
4083977010	082813107	2	66		49		59	
4083977011	082813108	2	63		36		47	
4083977012	082813109	2	61		43		53	
4083977013	082913127	5	46		26	1q, 50	27	1q, 50
4083977014	082913128	2	69		43		48	
4083977015	082913129	2	47		36		41	
4083977016	082913140	2	55		43		46	
4083977017	082913141	1	39		37		48	
4083977018	082913142	1	41		46		43	
4083977019	082913147	1	36		47		52	
4084169001	083013150	2	48		41		41	
4084169002	083013151	1	72		56		57	
4084169003	083013152	1	41		35		34	
4084169004	083013159	4	39		36		37	
4084169005	083013167	2	61		53		56	
4084169006	083013168	1	37		38		35	
4084169007	083013169	2	40		32		33	
4084169008	083013175	1	26		41		44	
4084169009	090313182	1	59		41		40	
4084169010	090313183	1	39		30		28	
4084169011	090313184	1	74		42		47	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2,4,6-Tribromophenol</i>		<i>2-Fluorophenol</i>		<i>Phenol-d₆</i>	
4084169012	090313201	20	41		32		33	
4084169013	090313204	1	48		46		53	
4084310001	090513234	1	70		48		55	
4084310002	090513235	1	80		52		58	
4084310003	090513236	1	58		44		46	
4084310004	090513241	1	63		43		49	
4084310005	090513242	1	56		45		48	
4084310006	090513243	10	38		27	SO	34	
4084310007	090513250	1	46		56		54	
4084310008	090513251	5	59		45		54	
4084310009	090513252	1	48		41		50	
4084310010	090513253	1	67		55		57	
4084310011	090513254	1	73		55		62	
4084310012	090513257	1	48		46		49	
4084310013	090513265	1	44		41		45	
4084310014	090513269	1	32		28		33	
4084310015	090513270	1	31		29		30	
4084310016	090513271	1	49		44		45	
4084310017	090513274	1	37		36		36	
4084310018	090513281	1	38		47		53	
4084566001	090613283	1	32		31		38	
4084566002	090613284	5	37		35		30	
4084566003	090613285	1	78		55		62	
4084566004	090613292	5	24		37		39	
4084566005	090613293	1	23		46		41	
4084566006	090613294	1	23		41		39	
4084566007	090613297	1	69		52		54	
4084566008	090613298	1	68		52		50	
4084566009	090613299	1	43		24	3q, SO	23	3q, SO
4084566010	090613310	1	51		34		32	
4084566011	090613311	2	52		48		48	
4084566012	090613312	2	3	2q, SO	3	2q, SO	3	2q, SO
4084566013	090613313	2	50		43		40	
4084566014	090613318	1	33		51		47	
4084566015	090613319	2	23		31		34	
4084566016	090913323	1	76		50		52	
4084566017	090913324	4	59		36		34	
4084566018	090913325	1	48		33		32	
4084566019	090913332	10	10	SO	30		30	
4084566020	090913333	1	42		46		43	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2,4,6-Tribromophenol</i>		<i>2-Fluorophenol</i>		<i>Phenol-d₆</i>	
4084566021	090913334	1	36		51		47	
4084566022	090913335	1	27		23	3q, S0	23	3q, S0
4084566023	090913336	10	44		47		39	
4084566024	090913337	5	39		30		31	
4084566025	090913344	10	45		46		59	
4084566026	090913345	1	34		41		41	
4084566027	090913346	1	46		32		35	
4084566028	090913347	5	47		33		32	
4084566029	090913348	10	54		45		38	
4084566030	090913357	10	13	2q, S0	25	2q, S0	31	
4084566031	090913358	1	29		45		40	
4084566032	090913359	1	55		57		53	
4084566033	090913361	4	45		42		42	
4084566034	090913362	1	65		47		51	
4084566035	090913363	2	56		52		50	
4084566036	091013373	1	48		54		47	
4084566037	091013374	2	66		50		51	
4084566038	091013375	1	77		47		46	
4084566039	091013395	3.33	17	3q, S0	36		40	
4084566040	091013396	10	14	3q, S0	30		38	
4084566041	091013397	1	35		31		43	
4084566042	091013398	1	89		51		51	
4084566043	091013399	1	87		54		53	
4084566044	091013400	1	80		47		50	
4084566045	091013418	2	41		38		41	
4084566046	091013419	4	44		39		42	
4084566047	091013421	1	65		40		42	
4084784001	091113424	1	41		31		33	
4084784002	091113425	1	50		37		34	
4084784003	091113426	1	25		20	1q, S0	23	1q, S0
4084784004	091113430	10	40		40		46	
4084784005	091113431	10	14	1q, S0	17	1q, S0	22	1q, S0
4084784006	091113432	20	27		32		41	
4084784007	091113437	5	55		46		55	
4084784008	091113438	1	67		48		54	
4084784009	091113439	5	54		45		46	
4084784010	091113450	5	61		48		50	
4084784011	091113451	1	83		54		69	
4084784012	091113452	10	30		22	S0	32	
4084784013	091113460	1	50		48		57	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2,4,6-Tribromophenol</i>		<i>2-Fluorophenol</i>		<i>Phenol-d₆</i>	
4084784014	091113461	5	33		39		36	
4084784015	091113462	5	42		41		43	
4084784016	091113463	1	27		19	1q, S0	19	1q, S0
4084784017	091113466	10	25		39		45	
4084784018	091113467	10	23		46		54	
4084784019	091113468	1	48		49		55	
4084784020	091213473	1	55		51		49	
4084784021	091213474	1	81		62		67	
4084784022	091213475	1	17	1q, S0	10	1q, S0	18	1q, S0
4084784023	091213486	1	62		50		54	
4084784024	091213487	1	63		57		60	
4084784025	091213488	1	78		66		68	
4084784026	091213489	1	71		56		57	
4084784027	091213495	10	28		39		55	
4084784028	091213496	5	38		47		59	
4084784029	091213497	1	50		55		74	
4084784030	091213498	1	59		54		67	
4084784031	091213499	1	65		54		63	
4084784032	091213500	5	65		55		57	
4084784033	091213509	5	48		32		38	
4084784034	091213510	1	65		51		59	
4084784035	091213511	5	70		42		60	
4084784036	091213518	10	40		33		50	
4084784037	091213519	5	27		30		45	
4084784038	091213520	1	39		39		55	
4085044001	091613545	5	56		45		60	
4085044002	091613548	1	37		42		50	
4085044003	091613553	1	60		59		60	
4085044004	091613554	1	57		48		55	
4085044005	091613555	10	0	2q, S0	0	2q, S0	0	2q, S0
4085044006	091613564	20	40		57		69	
4085044007	091613565	1	48		53		65	
4085044008	091613566	1	64		56		70	
4085044009	091713569	1	84		56		56	
4085044010	091713570	1	56		40		38	
4085044011	091713571	1	16	2q, S0	10	2q, S0	11	2q, S0
4085044012	091713587	10	65		45		46	
4085044013	091713590	4	45		42		43	
4085044014	091713591	1	45		42		55	
4085044015	091713592	1	44		48		55	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2,4,6-Tribromophenol</i>		<i>2-Fluorophenol</i>		<i>Phenol-d₆</i>	
4085044016	091713594	1	80		50		60	
4085044017	091713588	1	72		52		57	
4085044018	091713595	1	51		28		32	
4085044019	091713596	1	67		46		50	
4085044020	091713597	1	64		46		48	
4085044021	091713609	10	43		36		34	
4085044022	091713611	1	35		41		61	
4085044023	091713612	1	49		52		71	
4085044024	091713613	1	48		49		63	
4085044026	091713615	1	69		47		60	
4085044027	091713616	1	72		51		55	
4085044028	091713617	1	71		50		49	
4085044029	091713629	5	57		43		42	
4085044030	091713630	1	52		54		54	
4085044031	091713631	1	55		58		63	
4085230001	091813637	1	81		59		65	
4085230002	091813638	1	64		50		52	
4085230003	091813639	1	48		37		43	
4085230004	091813649	1	47		38		41	
4085230005	091813650	1	37		22	SO	33	
4085230006	091813651	1	54		37		53	
4085230008	091813655	1	58		44		53	
4085230009	091813656	1	65		46		54	
4085230010	091813657	1	58		49		52	
4085230011	091813671	10	49		35		42	
4085230012	091813672	1	27		45		58	
4085230013	091813673	1	25		41		53	
4085230014	091813674	5	35		27	SO	30	
4085230015	091813675	1	69		42		57	
4085230016	091813676	1	69		53		58	
4085230017	091813677	1	52		37		43	
4085230018	091813686	10	23		27	SO	35	
4085230019	091813687	1	43		40		43	
4085230020	091813688	1	80		45		52	
4085230021	091813689	1	18		26	4q, SO	25	4q, SO
4085230022	091813690	1	21		24	4q, SO	22	4q, SO
4085230023	091813693	5	31		27	SO	39	
4085230024	091813694	5	35		40		52	
4085230025	091813695	1	50		47		50	
4085230026	091913699	1	99		49		58	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2,4,6-Tribromophenol</i>		<i>2-Fluorophenol</i>		<i>Phenol-d₆</i>	
4085230027	091913700	1	59		25	4q, S0	25	4q, S0
4085230028	091913701	5	71		47		46	
4085230029	091913712	10	42		31		31	
4085230030	091913713	1	58		39		49	
4085230031	091913714	1	66		46		48	
4085230032	091913716	1	90		58		54	
4085230033	091913717	1	76		56		52	
4085230034	091913718	1	80		59		58	
4085230035	091913719	8	58		52		45	
4085230036	091913730	5	45		51		59	
4085483001	092313734	1	76		57		54	
4085483002	092313735	1	81		50		55	
4085483003	092313736	1	74		45		46	
4085483004	092313741	1	90		60		58	
4085483005	092313742	1	82		56		56	
4085483006	092313743	1	77		51		54	
4085483007	092313747	1	49		55		62	
4085483008	092313749	1	84		56		59	
4085483009	092313750	1	90		62		58	
4085483010	092313751	4	53		36		36	
4085483011	092313758	1	41		48		51	
4085483012	092313760	1	61		45		44	
4085483013	092313759	1	45		47		44	
4085483014	092313761	1	80		57		58	
4085483015	092313762	1	78		59		63	
4085483016	092313763	1	72		47		49	
4085483017	092313772	4	64		35		43	
4085483018	092313773	1	59		38		47	
4085483019	092313774	1	52		46		49	
4085483020	092413776	1	71		47		54	
4085483021	092413777	1	73		58		66	
4085483022	092413778	1	69		56		66	
4085483023	092413797	1	59		30		38	
4085483024	092413798	1	70		47		60	
4085483025	092413799	1	53		42		44	
4085483026	092413800	1	65		54		55	
4085483027	092413801	4	69		46		53	
4085483028	092413809	1	56		50		54	
4085483029	092413810	1	46		34		43	
4085483030	092413811	1	38		25	S0	35	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₆	
4085483031	092413813	1	49		36		44	
4085483032	092413814	1	82		56		61	
4085483033	092413815	1	66		46		48	
4085483034	092413824	1	41		43		53	
4085483035	092413825	1	44		49		52	
4085483036	092413827	1	69		50		54	

Table 3-13. Sediment Method 8270 Surrogate Compound Recoveries (PACE Indiana)

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d ₅	
			Limits:	16	122	24	104	28
4085729001	092513001	10	0	S4	0	S4	30	
4085729002	092513002	10	42		46		51	
4085729003	092513003	10	51		56		59	
4085729004	092513009	10	60		50		47	
4085729005	092513010	1	86		66		63	
4085729006	092513016	10	30		32		30	
4085729007	092513017	1	50		54		51	
4085729008	092513018	10	60		42		43	
4085729009	092513022	10	54		46		40	
4085729010	092513027	10	44		37		37	
4085729011	092513028	1	85		66		66	
4085729012	092513031	10	53		50		48	
4085729013	092513032	1	30		33		32	
4085729014	092513033	10	0	S4	43		45	
4085729015	092513034	10	32		43		45	
4085729016	092513040	10	36		44		44	
4085729017	092513044	1	76		75		71	
4085729018	092513045	1	89		64		61	
4085729019	092613048	10	49		57		60	
4085729020	092613049	10	0	S4	24		28	
4085729021	092613050	10	27		30		36	
4085729022	092613065	10	30		42		44	
4085729023	092613067	1	95		69		65	
4085729024	092613071	10	46		54		56	
4085729025	092613072	10	17		0	S4	23	S4

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d₅	
4085729026	092613073	1	57		57		57	
4085729027	092613086	10	25		40		38	
4085729028	092613088	1	80		69		65	
4085983001	092713095	10	54		66		55	
4085983002	092713096	10	54		56		50	
4085983003	092713097	10	60		63		53	
4085983004	092713101	1	79		69		65	
4085983005	092713107	1	52		67		66	
4085983006	092713110	1	90		78		77	
4085983007	092713114	1	90		78		76	
4085983008	092713115	1	104		94		90	
4085983009	092713116	1	75		71		67	
4085983010	092713118	1	94		83		80	
4085983011	092713119	1	90		84		78	
4085983012	092713121	1	81		75		72	
4085983013	092713127	1	90		77		80	
4085983014	092713128	1	48		59		57	
4085983015	100113140	1	57		46		44	
4085983016	100113141	1	82		64		62	
4085983017	100113142	1	85		65		61	
4085983018	100113147	1	77		69		64	
4085983019	100113155	1	90		76		73	
4085983020	100113156	1	87		79		72	
4085983021	100113158	1	48		66		66	
4086154001	100213166	1	80		49		54	
4086154002	100213167	1	84		53		58	
4086154003	100213168	1	78		52		56	
4086154004	100213172	5	75		65		65	
4086154005	100213178	1	42		55		56	
4086154006	100213181	1	38		56		55	
4086154007	100213182	5	61		42		43	
4086154008	100213183	1	70		64		63	
4086154009	100213184	1	83		54		56	
4086154010	100213191	5	69		64		64	
4086154011	100213193	1	66		72		74	
4086154012	100213194	1	76		72		73	
4086154013	100213196	1	86		60		67	
4086154014	100213197	1	88		59		62	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2,4,6-Tribromophenol</i>		<i>2-Fluorophenol</i>		<i>Phenol-d₅</i>	
4086154015	100213198	1	93		75		76	
4086154016	100213209	5	90		82		80	
4086154017	100213210	1	56		75		77	
4086154018	100213212	1	88		73		74	
4086154019	100313213	1	80		53		58	
4086154020	100313214	1	86		71		73	
4086154021	100313215	1	80		70		72	
4086154022	100313231	5	90		74		76	
4086154023	100313236	1	64		68		71	
4086154024	100313238	1	83		55		64	
4086154025	100313239	1	81		68		66	
4086154026	100313240	1	68		46		49	
4086154027	100313249	1	89		76		77	
4086154028	100313251	1	64		74		74	

Table 3-14. Water Method 8270 Surrogate Recoveries

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2,4,6-Tribromophenol</i>		<i>2-Fluorophenol</i>		<i>Phenol-d₅</i>	
			Limits:	20	155	15	190	10
200-18170-1	082613001	1	57		74		58	
200-18170-2	082713024	1	66		53		37	
200-18273-19	082813083	1	77		57		36	
200-18273-20	082913126	1	72		53		34	
200-18312-15	083013149	1	81		50		30	
200-18312-16	090313180	1	75		50		31	
200-18336-1	090413210	1	66		43		26	
200-18336-3	090513233	1	65		42		25	
200-18393-1	090613282	1	73		50		33	
200-18393-3	090913322	1	63		46		30	
200-18393-4	091013372	1	76		52		34	
200-18438-1	091113422	1	70		47		30	
200-18438-3	091213472	1	79		55		36	
200-18503-1	091313524	1	77		55		34	
200-18503-3	091613539	1	62		48		29	
200-18503-4	091713568	1	77		77		59	
200-18545-1	091813636	1	76		49		28	
200-18545-2	091913697	1	77		52		30	

Lab Sample Number	Field ID	Dilution	2,4,6-Tribromophenol		2-Fluorophenol		Phenol-d₅	
200-18620-1	092313732	1	66		51		32	
200-18620-3	092413775	1	69		50		32	
200-18668-1	092513828	1	87		58		33	
200-18668-2	092613047	1	80		53		29	
200-18754-1	092713094	1	57		37		23	
200-18754-2	093013131	1	67		39		25	
200-18754-4	100113139	1	57		34		22	
200-18810-1	100213164	1	44		49		28	
200-18810-3	100313237	1	29		46		25	

3.2.5 Internal Standard Areas

Several sample analyses reported in this data set have internal standard areas less than -50% of the area response of the corresponding continuing calibration verification for acenaphthalene-d₁₀. For samples where the internal standard response is less than 50% of the area response of the corresponding continuing calibration verification, the June 2008 CLP National Functional Guidelines directs the reviewer to qualify positive results associated with the low response as estimated ("J") while non-detected values are qualified as unusable ("R").

Due to these conditions associated results for samples 092513010,092513028, 092513044, 092613067 and, 092613088 will be qualified as estimated ("J" for positive values) or rejected ("R" for non-detects).

3.2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on multiple samples. Note that samples analyzed at PACE Indiana were only spiked for phenol in MS/MSD analyses.

In a few cases, some of the target analytes for the MS/MSD analyses samples recovered outside the limits used by the laboratory. The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The matrix spike/matrix spike duplicate results are summarized in Tables 3-15 and 3-16.

Table 3-15. Sediment Method 8270 MS/MSD Recoveries

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	MSD Result (µg/Kg)	Rec (%)	Lower Limit	Upper Limit	RPD	Lab Sample Result (µg/Kg)	Max RPD
082613003	2,4-Dimethylphenol	4020	3410	85	3010	75	17	139	12	201 U	29
	2-Methylphenol(o-Cresol)	4020	2670	67	2380	59	33	130	11	201 U	29
	3&4-Methylphenol(m&p Cresol)	4020	2790	67	2390	57	28	130	15	97.4 J	29
	Phenol	4020	2150	53	2000	49	39	130	7	47.8 U	30
082813097	2,4-Dimethylphenol	3500	2280	65	1660	48	17	139	31	349 UR1	29
	2-Methylphenol(o-Cresol)	3500	1830	52	1400	40	33	130	27	349 U	29
	3&4-Methylphenol(m&p Cresol)	3500	2110	47	1610	33	28	130	27	462 J	29
	Phenol	3500	1630	47	1080	31	39	130	40	83.0 UD3, M1, R1	30
090513236	2,4-Dimethylphenol	3920	3830	98	4250	109	17	139	10	196 U	29
	2-Methylphenol(o-Cresol)	3920	2990	76	3430	87	33	130	14	196 U	29
	3&4-Methylphenol(m&p Cresol)	3920	3080	68	3550	80	28	130	14	417	29
	Phenol	3920	2300	56	2710	66	39	130	16	121 J	30
090313183	2,4-Dimethylphenol	8340	7700	92	7570	91	17	139	2	417 U	29
	2-Methylphenol(o-Cresol)	8340	6310	76	6140	74	33	130	3	417 U	29
	3&4-Methylphenol(m&p Cresol)	8340	6230	72	6330	74	28	130	2	191 J	29
	Phenol	8340	5160	61	4750	56	39	130	8	99.2 U	30
090613298	2,4-Dimethylphenol	3960	3420	86	3490	88	17	139	2	198 U	29
	2-Methylphenol(o-Cresol)	3960	2910	74	2710	69	33	130	7	198 UL2	29
	3&4-Methylphenol(m&p Cresol)	3960	3070	70	3060	70	28	130	0	297 JL2	29
	Phenol	3960	2250	54	2050	49	39	130	9	97.2 JL2	30
090913332	2,4-Dimethylphenol	2010	1650 J	82	1340	66	17	139		1000 U	29
	2-Methylphenol(o-Cresol)	2010	1000 U	48	820	41	33	130		1000 U	29
	3&4-Methylphenol(m&p Cresol)	2010	891 J	44	731	36	28	130		210 U	29
	Phenol	2010	940 J	47	786	39	39	130		239 UD3	30
091013399	2,4-Dimethylphenol	3960	4140	105	4010	102	17	139	3	198 U	29
	2-Methylphenol(o-Cresol)	3960	3090	78	3060	77	33	130	1	198 U	29
	3&4-Methylphenol(m&p Cresol)	3960	3210	78	3260	80	28	130	2	115 J	29
	Phenol	3960	2440	59	2490	60	39	130	2	94.3 J	30
091113468	2,4-Dimethylphenol	1920	1670	87	1420	74	17	139	16	95.9 U	29
	2-Methylphenol(o-Cresol)	1920	1370	71	1190	62	33	130	13	95.9 U	29
	3&4-Methylphenol(m&p Cresol)	1920	1310	69	1170	61	28	130	11	20.0 UL2	29
	Phenol	1920	1180	62	1030	54	39	130	13	22.8 U	30
091213474	2,4-Dimethylphenol	4290	3320	78	3910	91	17	139	16	214 U	29
	2-Methylphenol(o-Cresol)	4290	2760	65	2960	69	33	130	7	214 U	29
	3&4-Methylphenol(m&p Cresol)	4290	2800	62	3040	67	28	130	8	157 J	29

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	MSD Result (µg/Kg)	Rec (%)	Lower Limit	Upper Limit	RPD	Lab Sample Result (µg/Kg)	Max RPD
	Phenol	4290	2500	57	2560	58	39	130	2	61.3 J	30
091713612	2,4-Dimethylphenol	1990	2400	121	1900	95	17	139	23	99.5 U	29
	2-Methylphenol(o-Cresol)	1990	1850	93	1550	78	33	130	18	99.5 U	29
	3&4-Methylphenol(m&p Cresol)	1990	1860	94	1520	76	28	130	20	20.7 U	29
	Phenol	1990	1590	80	1360	68	39	130	16	23.7 U	30
091813657	2,4-Dimethylphenol	3860	3350	87	3310	86	17	139	1	192 U	29
	2-Methylphenol(o-Cresol)	3860	2750	72	2610	68	33	130	5	192 U	29
	3&4-Methylphenol(m&p Cresol)	3860	3010	64	2940	62	28	130	3	547	29
	Phenol	3860	2440	60	2200	54	39	130	10	127 JL2	30
091913713	2,4-Dimethylphenol	1990	2110	106	1800	90	17	139	16	99.4 U	29
	2-Methylphenol(o-Cresol)	1990	1710	85	1370	68	33	130	23	99.4 U	29
	3&4-Methylphenol(m&p Cresol)	1990	1760	84	1410	66	28	130	22	103 J	29
	Phenol	1990	1550	76	1160	56	39	130	28	46.6 J	30
091913730	2,4-Dimethylphenol	1990	1930	97	1770	89	17	139	9	497 U	29
	2-Methylphenol(o-Cresol)	1990	1470	74	1380	69	33	130	6	497 U	29
	3&4-Methylphenol(m&p Cresol)	1990	1370	69	1310	66	28	130	5	104 U	29
	Phenol	1990	1240	62	1130	57	39	130	9	118 UD3	30
092313758	2,4-Dimethylphenol	1960	1490	77	1450	74	17	139	3	97.6 U	29
	2-Methylphenol(o-Cresol)	1960	1210	62	1180	61	33	130	3	97.6 UL2	29
	3&4-Methylphenol(m&p Cresol)	1960	1200	61	1160	60	28	130	3	20.3 UL2	29
	Phenol	1960	1080	55	988	51	39	130	9	23.2 UL2	30
092413814	2,4-Dimethylphenol	4240	4490	106	4520	107	17	139	1	423 U	29
	2-Methylphenol(o-Cresol)	4240	3450	82	3590	85	33	130	4	423 U	29
	3&4-Methylphenol(m&p Cresol)	4240	3310	72	3520	77	28	130	6	275 J	29
	Phenol	4240	2660	61	2730	63	39	130	3	101 U	30

Table 3-16. Sediment Method 8270 MS/MSD Recoveries (PACE Indiana)

<i>Sample ID</i>	<i>Analyte</i>	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Lower Limit</i>	<i>Upper Limit</i>	<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
092513017	Phenol	7160	2290	32	7160	3110	43	22	97	30	358 U	20
092713101	Phenol	63900	42200	66	63900	38800	63	22	97	9	3160 U	20
100213178	Phenol	4140	2380	58	4140	2060	50	22	97	14	193 U	20
100213181	Phenol	3920	1860	48	3920	2040	52	22	97	9	192 U	20
100213197	Phenol	68900	41900	61	68900	44000	64	22	97	5	3300U	20

3.2.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples.

Samples analyzed at PACE Indiana were only spike for phenol in and the LCS. Only the last batch of water samples analyzed at TestAmerica contains 3&4-Methylphenol (m&p Cresol) in the LCS. The spike solution was changed in early October to include 3&4-Methylphenol (m&p Cresol).

Some of the target analytes for the laboratory control samples recovered below the limits used by the laboratory. Positive results for the failed analytes in the batches are qualified as estimated ("J") non detects will be qualified as rejected ("R"). The laboratory control sample results are given in Table 3-17 through 3-19.

Table 3-17. Sediment Method 8270 LCS Results Summary

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 139214</i>			<i>QC Batch: 139740</i>			<i>QC Batch: 139870</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>
2,4-Dimethylphenol	66	130	1670	1450	87	1670	1530	92	1670	1690	101
2-Methylphenol(o-Cresol))	65	130	1670	1200	72	1670	1300	78	1670	1420	85
3&4-Methylphenol(m&p Cresol)	63	130	1670	1200	72	1670	1220	73	1670	1400	84
Phenol	62	130	1670	1110	67	1670	1220	73	1670	1190	71

Table 3-17. Sediment Method 8270 LCS Results Summary Cont 1

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 140125</i>			<i>QC Batch: 140411</i>			<i>QC Batch: 140553</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>
2,4-Dimethylphenol	66	130	1670	1530	92	1670	1350	81	1670	1390	84
2-Methylphenol(o-Cresol))	65	130	1670	1280	77	1670	1220	73	1670	1170	70
3&4-Methylphenol(m&p Cresol)	63	130	1670	1240	74	1670	1150	69	1670	1090	66
Phenol	62	130	1670	1170	70	1670	1130	68	1670	1110	67

Table 3-17. Sediment Method 8270 LCS Results Summary Cont 2

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 140834</i>			<i>QC Batch: 140998</i>			<i>QC Batch: 141168</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>
2,4-Dimethylphenol	66	130	1670	1110	66	1670	1430	86	1670	1460	88
2-Methylphenol(o-Cresol))	65	130	1670	1070	64	1670	1180	71	1670	1200	72
3&4-Methylphenol(m&p Cresol)	63	130	1670	1010	60	1670	1120	67	1670	1240	74
Phenol	62	130	1670	1010	61	1670	1030	62	1670	1180	71

Table 3-17. Sediment Method 8270 LCS Results Summary Cont 3

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 141400</i>			<i>QC Batch: 141523</i>			<i>QC Batch: 141553</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>
2,4-Dimethylphenol	66	130	1670	1370	82	1670	1420	85	1670	1510	91
2-Methylphenol(o-Cresol))	65	130	1670	1080	65	1670	1140	68	1670	1230	74
3&4-Methylphenol(m&p Cresol)	63	130	1670	1040	62	1670	1080	65	1670	1180	71
Phenol	62	130	1670	1120	67	1670	1180	71	1670	1250	75

Table 3-17. Sediment Method 8270 LCS Results Summary Cont 4

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 141710</i>			<i>QC Batch: 141864</i>			<i>QC Batch: 141940</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Rec (%)</i>
2,4-Dimethylphenol	66	130	1670	1400	84	1670	1520	91	1670	1440	87
2-Methylphenol(o-Cresol))	65	130	1670	1110	66	1670	1260	76	1670	1230	74
3&4-Methylphenol(m&p Cresol)	63	130	1670	1090	66	1670	1210	73	1670	1220	73
Phenol	62	130	1670	1160	70	1670	1130	68	1670	1220	73

Table 3-17. Sediment Method 8270 LCS Results Summary Cont 5

Analyte	Rec Limits (%)		QC Batch: 142064			QC Batch: 142065			QC Batch: 142219		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2,4-Dimethylphenol	66	130	1670	1530	92	1670	1520	91	1670	1440	86
2-Methylphenol(o-Cresol)	65	130	1670	1300	78	1670	1220	73	1670	1320	79
3&4-Methylphenol(m&p Cresol)	63	130	1670	1300	78	1670	1150	69	1670	1230	74
Phenol	62	130	1670	1260	75	1670	1000	60	1670	1170	70

Table 3-17. Sediment Method 8270 LCS Results Summary Cont 6

Analyte	Recovery Limits (%)		QC Batch: 142545			QC Batch: 142655		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2,4-Dimethylphenol	66	130	1670	1280	77	1670	1510	91
2-Methylphenol(o-Cresol)	65	130	1670	995	60	1670	1160	69
3&4-Methylphenol(m&p Cresol)	63	130	1670	988	59	1670	1060	64
Phenol	62	130	1670	972	58	1670	1270	76

Table 3-18. Sediment Method 8270 LCS Results Summary (PACE Indiana)

Analyte	Recovery Limits (%)		QC Batch: 143020			QC Batch: 203005			QC Batch: 203006		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Phenol	37	101	3330	1910	57	3330	1980	59	3330	2540	76

Table 3-18. Sediment Method 8270 LCS Results Summary (PACE Indiana) Cont 1

Analyte	Recovery Limits (%)		QC Batch: 203531			QC Batch: 203532			QC Batch: 203689		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Phenol	37	101	3330	2140	64	3330	1720	52	3330	2270	68

Table 3-18. Sediment Method 8270 LCS Results Summary (PACE Indiana) Cont 2

Analyte	Recovery Limits (%)		QC Batch: 203690		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
Phenol	37	101	3330	2270	68

Table 3-19. Water Method 8270 LCS Summary

Analyte	Rec Limits (%)		QC Batch: 200-61045			QC Batch: 200-61367			QC Batch: 200-61426		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2,4-Dimethylphenol	45	125	50.0	30.9	62	50.0	35.4	71	50.0	8.91 J *	18
									50.0	35.5	71
									50.0	35.1	70
2-Methylphenol(o-Cresol)	55	110	50.0	37.9	76	50.0	37.1	74	50.0	39.4	79
									50.0	40.2	80
									50.0	40.7	81
Phenol	20	70	50.0	22.1	44	50.0	21.5	43	50.0	26.0	52
									50.0	23.4	47
									50.0	22.9	46

Table 3-19. Water Method 8270 LCS Summary Cont 1

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 200-61572</i>			<i>QC Batch: 200-61628</i>			<i>QC Batch: 200-61869</i>		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2,4-Dimethylphenol	45	125	50.0	43.8	88	50.0	40.5	81	50.0	38.2	76
						50.0	37.7	75			
2-Methylphenol(o-Cresol)	55	110	50.0	46.5	93	50.0	42.5	85	50.0	40.6	81
						50.0	38.2	76			
Phenol	20	70	50.0	28.9	58	50.0	22.3	45	50.0	21.3	43
						50.0	19.3	39			

Table 3-19. Water Method 8270 LCS Summary Cont 2

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 200-62185</i>			<i>QC Batch: 200-62503</i>			<i>QC Batch: 200-62934</i>		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2,4-Dimethylphenol	45	125	50.0	42.8	86	50.0	29.4	59	50.0	33.9	68
2-Methylphenol(o-Cresol)	55	110	50.0	44.5	89	50.0	38.9	78	50.0	40.7	81
3&4-Methylphenol(m&p Cresol)	50	100							50.0	33.0	66
Phenol	20	70	50.0	21.7	43	50.0	21.8	44	50.0	20.2	40

3.2.8 Field Duplicates

Field duplicates generally exhibited good agreement for most of analytes with all RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. None of the results outside the 30% RPD are greater than 2x the LOQ therefore no data are qualified based on the field duplicate results.

The results of the field duplicate analyses are given in Table 3-20.

Table 3-20. Sediment Method 8270 Field Duplicate Results

<i>Analyte</i>	<i>Sample ID: 082613004</i>			<i>Sample ID: 082613023</i>			<i>RPD</i>	<i>Sample ID: 082813099</i>			<i>Sample ID: 082813106</i>			<i>RPD</i>
	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>		<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	
2,4-Dimethylphenol	187	U	376	196	U	393	0.0	101	U	202	102	U	204	0.0
2-Methylphenol(o-Cresol)	187	U	376	196	U	393	0.0	101	U	202	102	U	204	0.0
3&4-Methylphenol(m&p Cresol)	208	J	376	186	J	393	11.2	21.0	U	202	21.2	U	204	0.0
Phenol	44.6	U	376	48.1	J	393	NC	24.0	U	202	24.2	U	204	0.0

Table 3-20. Sediment Method 8270 Field Duplicate Results Cont 1

Analyte	Sample ID: 090513243			Sample ID: 090513251			RPD	Sample ID: 090913333			Sample ID: 090913334			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	1860	U	3740	923	U	1850	0.0	101	U	203	101	U	203	0.0
2-Methylphenol(o-Cresol)	1860	U	3740	923	U	1850	0.0	101	U	203	101	U	203	0.0
3&4-Methylphenol(m&p Cresol)	389	U	3740	234	J	1850	NC	21.1	U	203	21.1	U	203	0.0
Phenol	443	UD3	3740	219	UD3	1850	0.0	24.1	U	203	24.1	U	203	0.0

Table 3-20. Sediment Method 8270 Field Duplicate Results Cont 2

Analyte	Sample ID: 090913363			Sample ID: 091013421			RPD	Sample ID: 091213475			Sample ID: 091213486			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	341	U	683	201	U	402	0.0	201	U	402	442	U	886	0.0
2-Methylphenol(o-Cresol)	341	U	683	201	U	402	0.0	201	U	402	442	U	886	0.0
3&4-Methylphenol(m&p Cresol)	80.8	J	683	135	J	402	50.2	58.4	J	402	436	J	886	152.8
Phenol	81.0	UD3	683	81.2	J	402	NC	47.7	U	402	314	J	886	NC

Table 3-20. Sediment Method 8270 Field Duplicate Results Cont 3

Analyte	Sample ID: 091713588			Sample ID: 091713594			RPD	Sample ID: 091813671			Sample ID: 091813674			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	175	U	351	171	U	342	0.0	1580	U	3160	866	U	1740	0.0
2-Methylphenol(o-Cresol)	175	U	351	171	U	342	0.0	1580	U	3160	866	U	1740	0.0
3&4-Methylphenol(m&p Cresol)	236	J	351	376		342	45.8	538	J	3160	481	J	1740	11.2
Phenol	41.6	U	351	41.6	J	342	NC	375	UD3, L2	3160	206	UD3, L2	1740	NC

Table 3-20. Sediment Method 8270 Field Duplicate Results Cont 4

Analyte	Sample ID: 091913701			Sample ID: 091913716			RPD	Sample ID: 092313751			Sample ID: 092313760			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	966	U	1940	186	U	372	0.0	783	U	1570	388	U	777	0.0
2-Methylphenol(o-Cresol)	966	U	1940	186	U	372	0.0	783	UL2	1570	388	UL2	777	0.0
3&4-Methylphenol(m&p Cresol)	491	J	1940	254	J	372	63.6	215	JL2	1570	156	JL2	777	31.8
Phenol	230	UD3	1940	62.8	J	372	NC	186	UD3, L2	1570	157	JL2	777	NC

Table 3-20. Sediment Method 8270 Field Duplicate Results Cont 5

Analyte	Sample ID: 092413815			Sample ID: 092413827			RPD	Sample ID: 092513018			Sample ID: 092513031			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	188	U	378	201	U	402	0.0	3760	U	7510	3790	U	7580	0.0
2-Methylphenol(o-Cresol)	188	U	378	201	U	402	0.0	3760	U	7510	3790	U	7580	0.0
3&4-Methylphenol(m&p Cresol)	171	J	378	69.3	J	402	84.6	7510	U	15000	7580	U	15200	0.0
Phenol	83.9	J	378	64.0	J	402	26.9	3760	U2q	7510	3790	U2q	7580	0.0

Table 3-20. Sediment Method 8270 Field Duplicate Results Cont 6

Analyte	Sample ID: 092713114			Sample ID: 092713118			RPD	Sample ID: 100213198			Sample ID: 100213212			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2,4-Dimethylphenol	3560	U	7130	3250	U	6490	0.0	3630	U	7270	3760	U	7520	0.0
2-Methylphenol(o-Cresol)	3560	U	7130	3250	U	6490	0.0	3630	U	7270	3760	U	7520	0.0
3&4-Methylphenol(m&p Cresol)	7130	U	14300	6490	U	13000	0.0	7270	U	14500	7520	U	15000	0.0
Phenol	3560	U	7130	3250	U	6490	0.0	3630	U	7270	3760	U	7520	0.0

3.3 SW-846 Method 8270C/SIM –PAHs

3.3.1 Summary

SW-846 Method 8270C/SIM employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM). A few of the sample were re-extracted outside of the holding time. Samples 092513044 and, 091913716 will be qualified with all positive results as estimated (“J”), and nondetect results as estimated (“UJ”).

3.3.2 Method Blanks, Equipment Blanks, Field Blanks

The samples were prepared in thirty-eight different preparation batches for sediment samples and nine different batches for water samples (equipment blanks). None of the sediment method blanks showed any level of contamination. The method blanks associated with three batches of water samples had multiple analyte failures. The associated sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a “U”. Results that are above the reporting limit, but less than five times the reporting limit, will be qualified as estimated (“J”) due to the low levels of the results. Results more than five times the reporting limit will not be qualified

The results for the method blanks are summarized in Table 3-21.

Twenty-seven equipment (rinsate) blanks were submitted for analysis. Most of the equipment blanks showed some level of contamination. The associated sediment sample results that are above the detection limit but below the reporting limit will be reported at the reporting limit and qualified with a (“U”). Results that are above the reporting limit, but less than five times the reporting limit, will be qualified as estimated (“J”) due to the low levels of the results. Results more than five times the reporting limit will not be qualified. To enable more accurate comparisons of field QC results with the associated samples, Shepherd Technical Services recommends for future sampling events that associated field QC samples be analyzed by the same laboratory as is analyzing the investigative samples

Table 3-21. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)

<i>Analyte</i>	<i>QC Batch: 139060</i>	<i>QC Batch: 139239</i>	<i>QC Batch: 139369</i>	<i>QC Batch: 139489</i>	<i>QC Batch: 139519</i>	<i>QC Batch: 139614</i>	<i>QC Batch: 139772</i>	<i>QC Batch: 140252</i>
2-Methylnaphthalene	8.3 U							
Acenaphthene	8.3 U							
Acenaphthylene	8.3 U							
Anthracene	8.3 U							
Benzo(a)anthracene	8.3 U							
Benzo(a)pyrene	3.0 U							
Benzo(b)fluoranthene	8.3 U							
Benzo(g,h,i)perylene	8.3 U							
Benzo(k)fluoranthene	2.9 U							
Chrysene	8.3 U							
Dibenz(a,h)anthracene	8.3 U							
Fluoranthene	8.3 U							
Fluorene	8.3 U							
Indeno(1,2,3-cd)pyrene	8.3 U							
Naphthalene	8.3 U							
Phenanthrene	8.3 U							
Pyrene	8.3 U							

**Table 3-21. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)
Cont 1**

<i>Analyte</i>	<i>QC Batch: 140497</i>	<i>QC Batch: 140554</i>	<i>QC Batch: 140724</i>	<i>QC Batch: 140747</i>	<i>QC Batch: 140771</i>	<i>QC Batch: 141049</i>	<i>QC Batch: 141129</i>	<i>QC Batch: 141130</i>
2-Methylnaphthalene	8.3 U							
Acenaphthene	8.3 U							
Acenaphthylene	8.3 U							
Anthracene	8.3 U							
Benzo(a)anthracene	8.3 U							
Benzo(a)pyrene	3.0 U							
Benzo(b)fluoranthene	8.3 U							
Benzo(g,h,i)perylene	8.3 U							
Benzo(k)fluoranthene	2.9 U							
Chrysene	8.3 U							
Dibenz(a,h)anthracene	8.3 U							
Fluoranthene	8.3 U							
Fluorene	8.3 U							
Indeno(1,2,3-cd)pyrene	8.3 U							
Naphthalene	8.3 U							
Phenanthrene	8.3 U							
Pyrene	8.3 U							

**Table 3-21. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)
Cont 2**

<i>Analyte</i>	<i>QC Batch: 141131</i>	<i>QC Batch: 141337</i>	<i>QC Batch: 141833</i>	<i>QC Batch: 141992</i>	<i>QC Batch: 141998</i>	<i>QC Batch: 142166</i>	<i>QC Batch: 142167</i>	<i>QC Batch: 142333</i>
2-Methylnaphthalene	8.3 U							
Acenaphthene	8.3 U							
Acenaphthylene	8.3 U							
Anthracene	8.3 U							
Benzo(a)anthracene	8.3 U							
Benzo(a)pyrene	3.0 U							
Benzo(b)fluoranthene	8.3 U							
Benzo(g,h,i)perylene	8.3 U							
Benzo(k)fluoranthene	2.9 U							
Chrysene	8.3 U							
Dibenz(a,h)anthracene	8.3 U							
Fluoranthene	8.3 U							
Fluorene	8.3 U							
Indeno(1,2,3-cd)pyrene	8.3 U							
Naphthalene	8.3 U							
Phenanthrene	8.3 U							
Pyrene	8.3 U							

**Table 3-21. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)
Cont 3**

<i>Analyte</i>	<i>QC Batch: 142498</i>	<i>QC Batch: 142511</i>	<i>QC Batch: 142657</i>	<i>QC Batch: 142773</i>	<i>QC Batch: 142819</i>	<i>QC Batch: 142857</i>	<i>QC Batch: 143284</i>	<i>QC Batch: 143614</i>
2-Methylnaphthalene	8.3 U							
Acenaphthene	8.3 U							
Acenaphthylene	8.3 U							
Anthracene	8.3 U							
Benzo(a)anthracene	8.3 U							
Benzo(a)pyrene	3.0 U							
Benzo(b)fluoranthene	8.3 U							
Benzo(g,h,i)perylene	8.3 U							
Benzo(k)fluoranthene	2.9 U							
Chrysene	8.3 U							
Dibenz(a,h)anthracene	8.3 U							
Fluoranthene	8.3 U							
Fluorene	8.3 U							
Indeno(1,2,3-cd)pyrene	8.3 U							
Naphthalene	8.3 U							
Phenanthrene	8.3 U							
Pyrene	8.3 U							

**Table 3-21. Sediment Method 8270-SIM Method Blank Results Summary (µg/Kg)
Cont 4**

<i>Analyte</i>	<i>QC Batch: 143680</i>	<i>QC Batch: 143702</i>	<i>QC Batch: 143912</i>	<i>QC Batch: 143976</i>	<i>QC Batch: 144142</i>	<i>QC Batch: 144280</i>
2-Methylnaphthalene	8.3 U					
Acenaphthene	8.3 U					
Acenaphthylene	8.3 U					
Anthracene	8.3 U					
Benzo(a)anthracene	8.3 U					
Benzo(a)pyrene	3.0 U					
Benzo(b)fluoranthene	8.3 U					
Benzo(g,h,i)perylene	8.3 U					
Benzo(k)fluoranthene	2.9 U					
Chrysene	8.3 U					
Dibenz(a,h)anthracene	8.3 U					
Fluoranthene	8.3 U					
Fluorene	8.3 U					
Indeno(1,2,3-cd)pyrene	8.3 U					
Naphthalene	8.3 U					
Phenanthrene	8.3 U					
Pyrene	8.3 U					

Table 3-22. Water Method 8270-SIM Method Blank Results Summary (µg/L)

<i>Analyte</i>	<i>QC Batch: 200-60767</i>	<i>QC Batch: 200-61229</i>	<i>QC Batch: 200-61230</i>	<i>QC Batch: 200-61374</i>	<i>QC Batch: 200-61971</i>
2-Methylnaphthalene	0.0012 U				
	0.0012 U	0.0012 U			0.0012 U
Acenaphthene	0.0011 U				
	0.0011 U	0.0011 U			0.0011 U
Acenaphthylene	0.0010 U				
	0.0010 U	0.0010 U			0.0010 U
Anthracene	0.00070 U				
	0.00070 U	0.00070 U			0.00070 U
Benzo(a)anthracene	0.0012 U				
	0.0012 U	0.0012 U			0.0012 U
Benzo(a)pyrene	0.00051 U				
	0.00051 U	0.00051 U			0.00051 U
Benzo(b)fluoranthene	0.0010 U				
	0.0010 U	0.0010 U			0.0010 U
Benzo(g,h,i)perylene	0.0020 U				
	0.0020 U	0.0020 U			0.0020 U
Benzo(k)fluoranthene	0.0011 U				
	0.0011 U	0.0011 U			0.0011 U
Chrysene	0.00091 U				
	0.00091 U	0.00091 U			0.00091 U
Dibenz(a,h)anthracene	0.0038 U				
	0.0038 U	0.0038 U			0.0038 U
Fluoranthene	0.00057 U				
	0.00057 U	0.00057 U			0.00057 U
Fluorene	0.0011 U				
	0.0011 U	0.0011 U			0.0011 U
Indeno(1,2,3-cd)pyrene	0.0031 U				
	0.0031 U	0.0031 U			0.0031 U
Naphthalene	0.0015 U	0.0015 U	0.0015 U	0.00631 J	0.0015 U
	0.0015 U	0.0015 U			0.0015 U
Phenanthrene	0.00079 U	0.00079 U	0.00079 U	0.00571 J	0.00079 U
	0.00079 U	0.00079 U			0.00079 U
Pyrene	0.0012 U				
	0.0012 U	0.0012 U			0.0012 U

Table 3-22. Water Method 8270-SIM Method Blank Results Summary (µg/L) Cont

<i>Analyte</i>	<i>QC Batch: 200-62265</i>	<i>QC Batch: 200-62266</i>	<i>QC Batch: 200-62406</i>	<i>QC Batch: 200-62573</i>
2-Methylnaphthalene	0.00511 J	0.0012 U	0.0012 U	0.0012 U
Acenaphthene	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Acenaphthylene	0.0010 U	0.0010 U	0.0010 U	0.00508 J
Anthracene	0.00070 U	0.00070 U	0.00070 U	0.00070 U
Benzo(a)anthracene	0.0012 U	0.0012 U	0.0012 U	0.00709 J
Benzo(a)pyrene	0.00051 U	0.00051 U	0.00051 U	0.00913 J
Benzo(b)fluoranthene	0.0010 U	0.0010 U	0.0010 U	0.00644 J
Benzo(g,h,i)perylene	0.0020 U	0.0020 U	0.0020 U	0.00776 J
Benzo(k)fluoranthene	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Chrysene	0.00091 U	0.00091 U	0.00091 U	0.00562 J
Dibenz(a,h)anthracene	0.0038 U	0.0038 U	0.0038 U	0.0038 U
Fluoranthene	0.00057 U	0.00057 U	0.00057 U	0.00645 J
Fluorene	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Indeno(1,2,3-cd)pyrene	0.0031 U	0.0031 U	0.0031 U	0.00618 J
Naphthalene	0.0015 U	0.0015 U	0.0015 U	0.0015 U
Phenanthrene	0.00079 U	0.00079 U	0.00079 U	0.00079 U
Pyrene	0.0012 U	0.0012 U	0.0012 U	0.00627 J

3.3.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 30% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

Most of the continuing calibration verification (CCV) checks for PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. The exceptions are CCVs analyzed with equipment blank samples. The CCV for benzo(b)fluoranthene associated with the

analysis of samples 091113422, 091213472, 092513828 and 092613047 exceeded the 25% D criterion and hence, samples results will be qualified as estimated ("J") with the exception of 092613047 which was not detected will be qualified as estimate ("UJ"). The CCV for dibenz(a,h)anthracene associated with the analysis of samples 091613539, 091313524, 091713568, 091813636 and 091913697 exceeded the 25% D criterion. Dibenz(a,h)anthracene was not detected in samples 091313524, 091713568, 091813636 and 091913697 and therefore the results are qualified as estimated ("UJ"). For sample 091613539, the positive value for dibenz(a,h)anthracene will be qualified as estimated ("J"). No other data are qualified as a consequence of the continuing calibration data.

The peak shapes and chromatographic resolution for the isomers benzo(b)fluoranthene and benzo(k)fluoranthene evident in the sample chromatograms for the samples indicate that the two isomers are not adequately resolved to be quantitated separately as the laboratory attempted to do. The laboratory's report narratives noted this issue but stopped short of reporting the two isomers as a coeluting pair (as is done for *m/p*-xylene). Consequently all positive results for benzo(b)fluoranthene and benzo(k)fluoranthene in all samples for these two isomers are qualified as estimated ("J").

3.3.4 Internal Standard Areas

The analysis for a few samples yielded an internal standard area less than 50% of the area response of the corresponding continuing calibration verification. Sample 092613088 recovered low for acenaphthene-d10 and perylene-d12, and sample 092713116 failed low for perylene-d12. For samples where the internal standard response is less than 50% of the area response of the corresponding continuing calibration verification, the June 2008 CLP National Functional Guidelines directs the reviewer to qualify positive results associated with the low response as estimated ("J") while non-detected values are qualified as unusable ("R").

3.3.5 Surrogate Compound Recoveries

Surrogates were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., PAHs), the surrogates reported should be adequate to monitor recovery in the analyses.

Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. A few samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Sample 100213178 with no dilution had a recovery below the lower limit. Since the failed

recovery is not attributable to dilution, positive results for this sample are qualified as estimated ("J"). Results for samples 090313180 and 091713568 recovered below the lower limit and will be qualified as estimated ("J") for all detected results.

The surrogate recoveries for all samples are presented in Tables 3-18 and 3-19.

Table 3-23. Sediment Method 8270-SIM Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Terphenyl-d ₁₄	
		Limits:	40	130	40	130
4083785002	082613003	5	82		82	
4083785003	082613004	20	72		75	
4083785005	082613016	80	67		77	
4083785006	082613017	1	79		75	
4083785007	082613018	1	106		103	
4083785008	082613023	5	59		62	
4083785009	082713025	40	54		62	
4083785010	082713026	20	67		72	
4083785011	082713027	4	67		64	
4083785012	082713043	10	29	2q, S0	29	2q, S0
4083785013	082713044	1	84		85	
4083785014	082713045	1	74		75	
4083785015	082713048	1	80		79	
4083785019	082713053	20	69		68	
4083785020	082713054	5	62		61	
4083785021	082713073	2	56		54	
4083785022	082713074	4	60		57	
4083785023	082713075	1	80		77	
4083785024	082713076	1	86		82	
4083977002	082813085	8	67		66	
4083977003	082813086	4	72		75	
4083977004	082813096	4	61		56	
4083977005	082813097	1	72		63	
4083977006	082813098	2.5	48		42	
4083977007	082813099	1	87		86	
4083977009	082813106	1	83		86	
4083977011	082813108	8	47		47	
4083977012	082813109	1	66		66	
4083977014	082913128	4	83		79	
4083977015	082913129	4	97		94	
4083977016	082913140	10	53		53	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2-Fluorobiphenyl</i>	<i>Terphenyl-d₁₄</i>
4083977017	082913141	1	71	69
4083977018	082913142	1	66	65
4083977019	082913147	1	69	70
4084169002	083013151	4	77	82
4084169003	083013152	4	62	64
4084169004	083013159	8	50	48
4084169006	083013168	8	58	55
4084169007	083013169	5	56	53
4084169008	083013175	1	75	73
4084169010	090313183	5	51	54
4084169011	090313184	4	56	56
4084169013	090313204	800	62	59
4084310002	090513235	4	44	52
4084310003	090513236	5	51	53
4084310004	090513241	2	57	59
4084310005	090513242	5	56	58
4084310007	090513250	1	58	57
4084310008	090513251	2	47	53
4084310010	090513253	2	50	55
4084310011	090513254	4	55	58
4084310012	090513257	2	54	55
4084310013	090513265	1	70	73
4084310015	090513270	2	57	59
4084310016	090513271	4	61	65
4084310018	090513281	1	57	55
4084566002	090613284	5	51	54
4084566003	090613285	1	57	60
4084566004	090613292	5	58	63
4084566005	090613293	1	59	59
4084566006	090613294	1	77	76
4084566008	090613298	8	44	46
4084566009	090613299	5	57	61
4084566010	090613310	2	53	54
4084566012	090613312	5	54	57
4084566013	090613313	8	51	52
4084566014	090613318	1	56	57
4084566015	090613319	8	92	92
4084566017	090913324	4	55	64
4084566018	090913325	20	47	51
4084566019	090913332	50	75	75

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2-Fluorobiphenyl</i>		<i>Terphenyl-d₁₄</i>	
4084566020	090913333	1	62		61	
4084566021	090913334	1	66		66	
4084566023	090913336	5	59		62	
4084566024	090913337	4	69		72	
4084566025	090913344	100	0	S4	0	S4
4084566026	090913345	1	66		68	
4084566028	090913347	2	70		73	
4084566029	090913348	5	59		61	
4084566031	090913358	1	60		62	
4084566032	090913359	1	58		59	
4084566034	090913362	4	43		47	
4084566035	090913363	10	51		57	
4084566037	091013374	8	94		85	
4084566038	091013375	1	51		51	
4084566039	091013395	5	71		73	
4084566040	091013396	40	67		66	
4084566041	091013397	4	55		55	
4084566042	091013398	4	55		62	
4084566044	091013400	2	71		79	
4084566045	091013418	2	55		55	
4084566046	091013419	100	0	S4	0	S4
4084566047	091013421	4	41		49	
4084784002	091113425	2	68		67	
4084784003	091113426	2	58		63	
4084784005	091113431	160	0	S4	0	S4
4084784006	091113432	1	81		73	
4084784008	091113438	4	75		78	
4084784009	091113439	4	48		41	
4084784011	091113451	5	60		59	
4084784012	091113452	5	62		70	
4084784013	091113460	1	86		77	
4084784015	091113462	20	72		65	
4084784016	091113463	10	74		71	
4084784017	091113466	200	0	S4	0	S4
4084784018	091113467	20	89		75	
4084784019	091113468	1	81		76	
4084784021	091213474	2	70		70	
4084784022	091213475	2	65		61	
4084784023	091213486	2	77		71	
4084784025	091213488	4	74		69	

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Terphenyl-d₁₄	
4084784026	091213489	5	64		59	
4084784028	091213496	25	109		101	
4084784029	091213497	1	75		68	
4084784031	091213499	8	76		75	
4084784032	091213500	5	72		70	
4084784034	091213510	2	68		69	
4084784035	091213511	8	78		71	
4084784036	091213518	1000	0	S4	0	S4
4084784037	091213519	20	75		67	
4084784038	091213520	5	101		93	
4085044001	091613545	2	61		58	
4085044002	091613548	4	74		71	
4085044004	091613554	2	60		59	
4085044005	091613555	4	42		41	
4085044007	091613565	10	66		64	
4085044008	091613566	20	62		55	
4085044010	091713570	8	61		62	
4085044011	091713571	20	74		70	
4085044012	091713587	8	40		34	1q, S0
4085044013	091713590	4	55		46	
4085044014	091713591	1	90		90	
4085044015	091713592	1	88		84	
4085044016	091713594	4	64		60	
4085044017	091713588	20	53		56	
4085044018	091713595	10	52		48	
4085044019	091713596	4	54		53	
4085044020	091713597	4	57		52	
4085044021	091713609	10	57		52	
4085044022	091713611	1	65		64	
4085044023	091713612	1	91		90	
4085044024	091713613	5	82		81	
4085044027	091713616	2	68		74	
4085044028	091713617	2	65		64	
4085044029	091713629	20	60		58	
4085044030	091713630	1	83		80	
4085044031	091713631	1	89		87	
4085230001	091813637	10	84		78	
4085230002	091813638	1	61		67	
4085230003	091813639	4	84		83	
4085230004	091813649	20	67		60	

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Terphenyl-d₁₄	
4085230005	091813650	1	84		75	
4085230006	091813651	1	84		82	
4085230009	091813656	4	64		68	
4085230010	091813657	5	58		58	
4085230011	091813671	20	66		71	
4085230012	091813672	40	61		64	
4085230013	091813673	1	98		98	
4085230014	091813674	40	54		57	
4085230016	091813676	4	54		65	
4085230017	091813677	5	70		63	
4085230018	091813686	100	0	S4	0	S4
4085230019	091813687	10	79		73	
4085230021	091813689	20	60		66	
4085230022	091813690	20	69		70	
4085230023	091813693	40	77		77	
4085230024	091813694	100	0	S4	0	S4
4085230025	091813695	10	82		75	
4085230027	091913700	2	72		71	
4085230028	091913701	40	64		64	
4085230030	091913713	10	88		82	
4085230031	091913714	2	67		62	
4085230032	091913716	2	67		59	
4085230034	091913718	5	62		55	
4085230035	091913719	5	54		47	
4085230036	091913730	200	0	S4	0	S4
4085483002	092313735	2	53		51	
4085483003	092313736	1	69		63	
4085483004	092313741	20	76		74	
4085483005	092313742	5	69		63	
4085483006	092313743	8	58		52	
4085483007	092313747	1	77		69	
4085483009	092313750	5	66		61	
4085483010	092313751	1	67		61	
4085483011	092313758	1	75		64	
4085483012	092313760	10	62		59	
4085483013	092313759	1	79		70	
4085483015	092313762	1	66		64	
4085483016	092313763	2.5	81		75	
4085483017	092313772	20	52		51	
4085483018	092313773	1	75		69	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2-Fluorobiphenyl</i>		<i>Terphenyl-d₁₄</i>	
4085483019	092313774	1	74		66	
4085483021	092413777	20	62		72	
4085483022	092413778	1	74		72	
4085483023	092413797	2	74		70	
4085483024	092413798	20	83		79	
4085483026	092413800	2	62		62	
4085483027	092413801	2	71		67	
4085483029	092413810	1	81		69	
4085483030	092413811	1	88		77	
4085483032	092413814	4	67		67	
4085483033	092413815	4	66		58	
4085483034	092413824	1	91		80	
4085483035	092413825	4	73		72	
4085483036	092413827	4	62		58	
4085729002	092513002	8	65		63	
4085729003	092513003	8	55		55	
4085729004	092513009	20	72		73	
4085729005	092513010	1	79		72	
4085729007	092513017	5	69		65	
4085729008	092513018	10	57		54	
4085729010	092513027	80	67		61	
4085729011	092513028	1	75		72	
4085729012	092513031	8	63		60	
4085729014	092513033	8	63		61	
4085729015	092513034	8	64		62	
4085729016	092513040	8	58		53	
4085729017	092513044	100	0	S4	0	S4
4085729018	092513045	10	92		89	
4085729020	092613049	2	77		64	
4085729021	092613050	2	62		56	
4085729022	092613065	40	61		57	
4085729023	092613067	8	89		84	
4085729025	092613072	20	65		65	
4085729026	092613073	8	58		57	
4085729027	092613086	20	54		50	
4085729028	092613088	1	93		88	
4085771036	092513058	20	58		51	
4085983002	092713096	20	62		61	
4085983003	092713097	20	50		53	
4085983004	092713101	20	73		78	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>2-Fluorobiphenyl</i>		<i>Terphenyl-d₁₄</i>	
4085983005	092713107	10	90		88	
4085983006	092713110	100	0	S4	0	S4
4085983007	092713114	4	70		73	
4085983009	092713116	5	95		95	
4085983010	092713118	20	60		63	
4085983011	092713119	20	58		64	
4085983012	092713121	10	50		52	
4085983014	092713128	1	90		79	
4085983016	100113141	20	48		48	
4085983017	100113142	2	55		52	
4085983018	100113147	20	70		71	
4085983019	100113155	40	64		65	
4085983020	100113156	20	64		64	
4085983021	100113158	8	87		77	
4086154002	100213167	20	73		69	
4086154003	100213168	20	48		49	
4086154005	100213178	1	0		0	
		4	82		74	
4086154006	100213181	1	70		60	
4086154008	100213183	100	0	S4	0	S4
4086154009	100213184	8	65		56	
4086154011	100213193	10	70		68	
4086154012	100213194	25	90		91	
4086154014	100213197	20	89		75	
4086154015	100213198	10	60		53	
4086154016	100213209	400	0	S4	0	S4
4086154017	100213210	1	81		72	
4086154018	100213212	20	79		84	
4086154020	100313214	5	59		53	
4086154021	100313215	8	68		61	
4086154022	100313231	20	45		46	
4086154023	100313236	1	88		79	
4086154025	100313239	4	67		58	
4086154026	100313240	4	69		60	
4086154027	100313249	10	70		57	
4086154028	100313251	10	99		87	

Table 3-24. Water Method 8270-SIM Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	2-Methylnaphthalene- <i>d</i> ₁₀		Benzo(a)pyrene- <i>d</i> ₁₂		Fluoranthene- <i>d</i> ₁₀		Fluorene- <i>d</i> ₁₀	
			Limits:	50	110	10	160	50	120	60
200-18170-1	082613001	1	89		85		76		68	
200-18170-2	082713024	1	88		75		75		68	
200-18273-19	082813083	1	90		81		78		70	
200-18273-20	082913126	1	87		85		78		70	
200-18312-15	083013149	1	83		94		89		70	
200-18312-16	090313180	1	69		77		74		56	X
200-18336-1	090413210	1	78		93		86		66	
200-18336-3	090513233	4	75		81		84		65	
200-18393-1	090613282	1	86		87		89		69	
200-18393-3	090913322	1	81		92		84		65	
200-18393-4	091013372	1	80		86		80		64	
200-18438-1	091113422	1	73		85		81		60	
200-18438-3	091213472	1	85		98		93		70	
		2	81		97		94		71	
200-18503-1	091313524	1	90		96		94		72	
200-18503-3	091613539	1	83		96		91		68	
200-18503-4	091713568	1	65		73		69		52	X
200-18545-1	091813636	1	82		94		92		69	
200-18545-2	091913697	1	86		86		88		69	
200-18620-1	092313732	1	84		89		86		66	
200-18620-3	092413775	1	84		112		98		68	
200-18668-1	092513828	1	76		91		84		64	
200-18668-2	092613047	1	78		95		86		67	
200-18754-1	092713094	5	86		72		98		70	
200-18754-2	093013131	1	83		80		76		64	
200-18754-4	100113139	1	78		70		77		62	
200-18810-1	100213164	1	90		97		94		71	
200-18810-3	100313237	1	90		101		96		71	

3.3.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on multiple samples.

In many cases some of the target analytes for the MS/MSD analyses samples recovered outside the limits used by the laboratory. The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data. The MS/MSD sample results are given in Table 3-25.

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 082613003

Analyte	MS Sample ID: 082613003			MSD Sample ID: 082613003			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	803	480	50	803	453	47	6	100 U	35
Acenaphthene	803	551	53	803	486	45	13	123 J	35
Acenaphthylene	803	587	56	803	494	44	17	138 J	25
Anthracene	803	856	64	803	783	55	9	340	38
Benzo(a)anthracene	803	1520	70	803	1440	60	5	957	30
Benzo(a)pyrene	803	1720	79	803	1700	77	1	1090	33
Benzo(b)fluoranthene	803	1880	125	803	1770	110	6	882	44
Benzo(g,h,i)perylene	803	1320	74	803	1270	68	4	723	33
Benzo(k)fluoranthene	803	1360	42	803	1380	44	1	1030	37
Chrysene	803	1870	82	803	1780	71	5	1210	38
Dibenz(a,h)anthracene	803	808	71	803	774	67	4	234	27
Fluoranthene	803	3150	107	803	3010	89	4	2290	50
Fluorene	803	618	60	803	522	48	17	134 J	32
Indeno(1,2,3-cd)pyrene	803	1180	70	803	1140	66	3	615	28
Naphthalene	803	543	51	803	509	47	7	132 J	40
Phenanthrene	803	1900	94	803	1810	82	5	1150	46
Pyrene	803	2550	74	803	2520	69	2	1960	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 082813097

<i>Analyte</i>	<i>MS Sample ID: 082813097</i>			<i>MSD Sample ID: 082813097</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	697	1090	96	697	1970	222	58	418 M1, R1	35
Acenaphthene	697	806	84	697	1310	157	48	216 M1, R1	35
Acenaphthylene	697	923	116	697	967	122	5	113	25
Anthracene	697	1140	119	697	1770	208	43	313 M1, R1	38
Benzo(a)anthracene	697	1860	208	697	2800	342	40	413 M1, R1	30
Benzo(a)pyrene	697	1830	200	697	2290	266	22	432 M1	33
Benzo(b)fluoranthene	697	1550	170	697	2310	280	40	359 M1	44
Benzo(g,h,i)perylene	697	837	84	697	946	99	12	253	33
Benzo(k)fluoranthene	697	1370	142	697	1520	164	11	378 M1	37
Chrysene	697	1970	205	697	1970	205	0	538 M1	38
Dibenz(a,h)anthracene	697	675	84	697	640	79	5	92.0	27
Fluoranthene	697	2320	198	697	4130	456	56	943 M1, R1	50
Fluorene	697	829	89	697	1360	165	48	206 M1, R1	32
Indeno(1,2,3-cd)pyrene	697	803	85	697	910	101	12	207	28
Naphthalene	697	744	73	697	1350	160	58	238 M1, R1	40
Phenanthrene	697	2080	159	697	4010	436	63	969 M1, R1	46
Pyrene	697	2530	236	697	4800	561	62	889 M1, R1	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 090313183

<i>Analyte</i>	<i>MS Sample ID: 090313183</i>			<i>MSD Sample ID: 090313183</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	1670	1040	49	1670	845	37	21	221 J	35
Acenaphthene	1670	1120	51	1670	895	38	22	267 J	35
Acenaphthylene	1670	1120	43	1670	925	32	19	392 J	25
Anthracene	1670	1470	40	1670	1330	32	10	802 M1	38
Benzo(a)anthracene	1670	2240	3	1670	2180	0	3	2180 M1	30
Benzo(a)pyrene	1670	2680	2	1670	2760	6	3	2650 M1	33
Benzo(b)fluoranthene	1670	2480	16	1670	2590	23	4	2210 M1	44
Benzo(g,h,i)perylene	1670	1930	15	1670	1980	18	3	1680	33
Benzo(k)fluoranthene	1670	2530	4	1670	2580	7	2	2460 M1	37
Chrysene	1670	2720	-9	1670	2920	3	7	2870 M1	38
Dibenz(a,h)anthracene	1670	1450	55	1670	1120	36	26	531	27
Fluoranthene	1670	4070	-55	1670	4470	-31	9	4990 M1	50
Fluorene	1670	1200	53	1670	1000	41	18	320 J	32
Indeno(1,2,3-cd)pyrene	1670	1820	23	1670	1820	24	0	1420	28
Naphthalene	1670	1040	45	1670	867	34	18	298 J	40
Phenanthrene	1670	2770	-3	1670	2860	2	3	2820 M1	46
Pyrene	1670	3640	-45	1670	3910	-28	7	4380 M1	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 090513236

<i>Analyte</i>	<i>MS Sample ID: 090513236</i>			<i>MSD Sample ID: 090513236</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	782	438	37	782	373	29	16	146 JM1	35
Acenaphthene	782	435	37	782	400	32	9	147 J	35
Acenaphthylene	782	437	38	782	431	37	1	141 J	25
Anthracene	782	640	34	782	613	30	4	376 M1	38
Benzo(a)anthracene	782	1050	7	782	1020	4	2	990 M1	30
Benzo(a)pyrene	782	1260	-2	782	1220	-7	3	1280 M1	33
Benzo(b)fluoranthene	782	1180	3	782	1130	-4	5	1160 M1	44
Benzo(g,h,i)perylene	782	811	5	782	743	-4	9	774 M1	33
Benzo(k)fluoranthene	782	1180	-10	782	1150	-13	2	1260 M1	37
Chrysene	782	1320	-21	782	1270	-26	3	1480 M1	38
Dibenz(a,h)anthracene	782	582	41	782	553	37	5	262	27
Fluoranthene	782	2120	-84	782	1930	-108	9	2780 M1	50
Fluorene	782	491	39	782	443	33	10	186 J	32
Indeno(1,2,3-cd)pyrene	782	784	11	782	732	5	7	696 M1	28
Naphthalene	782	494	34	782	411	23	18	229 M1	40
Phenanthrene	782	1420	-28	782	1260	-49	12	1640 M1	46
Pyrene	782	1890	-60	782	1730	-80	8	2360 M1	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 090613298

<i>Analyte</i>	<i>MS Sample ID: 090613298</i>			<i>MSD Sample ID: 090613298</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	790	409	17	790	312	5		276 JM1	35
Acenaphthene	790	532	20	790	403	4	28	373 M1	35
Acenaphthylene	790	400	17	790	333	8	18	266 JM1	25
Anthracene	790	1080	49	790	756	8	35	693 M1	38
Benzo(a)anthracene	790	1360	-52	790	1010	-96	29	1770 M1	30
Benzo(a)pyrene	790	1420	-86	790	1140	-122	22	2110 M1	33
Benzo(b)fluoranthene	790	1210	-41	790	1170	-46	3	1530 1q, M1	44
Benzo(g,h,i)perylene	790	897	-38	790	744	-57	19	1200 M1	33
Benzo(k)fluoranthene	790	1300	-94	790	943	-140	32	2050 1q, M1	37
Chrysene	790	1570	-89	790	1260	-129	22	2280 M1	38
Dibenz(a,h)anthracene	790	567	25	790	466	12	20	371 M1	27
Fluoranthene	790	2780	-261	790	2040	-354	31	4840 M1	50
Fluorene	790	584	30	790	450	13	26	344 M1	32
Indeno(1,2,3-cd)pyrene	790	825	-24	790	667	-44	21	1010 M1	28
Naphthalene	790	430	22	790	295	5		254 JM1	40
Phenanthrene	790	2120	-87	790	1510	-164	34	2800 M1	46
Pyrene	790	2400	-248	790	1750	-330	31	4360 M1	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 090913332

<i>Analyte</i>	<i>MS Sample ID: 090913332</i>			<i>MSD Sample ID: 090913332</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	402	4260	-314	402	11700	1530	93	5530 M6, R1	35
Acenaphthene	402	2730	-208	402	7800	1050	96	3570 M6, R1	35
Acenaphthylene	402	502 U	26	402	1090	175		502 UM6	25
Anthracene	402	2180	-43	402	4860	624	76	2350 M6, R1	38
Benzo(a)anthracene	402	940 J	-12	402	2160	290		989 JM6	30
Benzo(a)pyrene	402	785 J	-24	402	1900	254		880 JM6	33
Benzo(b)fluoranthene	402	502 U	18	402	984	147		502 U1q, M6	44
Benzo(g,h,i)perylene	402	502 U	14	402	905	132		502 U	33
Benzo(k)fluoranthene	402	660 J	33	402	1330	200		527 J1q, M6	37
Chrysene	402	1130	-24	402	2440	303	73	1230 M6, R1	38
Dibenz(a,h)anthracene	402	502 U	53	402	588	126		502 U	27
Fluoranthene	402	1690	-41	402	3880	506	79	1850 M6, R1	50
Fluorene	402	1700	-44	402	4260	592	86	1880 M6, R1	32
Indeno(1,2,3-cd)pyrene	402	502 U	33	402	698	117		502 U	28
Naphthalene	402	11900	-855	402	19800	1110	50	15400 M6, R1	40
Phenanthrene	402	4460	-314	402	12000	1570	92	5720 M6, R1	46
Pyrene	402	2380	-142	402	5820	713	84	2950 M6, R1	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 091213474

<i>Analyte</i>	<i>MS Sample ID: 091213474</i>			<i>MSD Sample ID: 091213474</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	855	446	40	855	522	49	16	105	35
Acenaphthene	855	486	48	855	546	55	11	79.0 J	35
Acenaphthylene	855	440	44	855	486	50	10	59.9 J	25
Anthracene	855	652	50	855	712	57	9	223	38
Benzo(a)anthracene	855	849	41	855	909	48	7	499	30
Benzo(a)pyrene	855	965	40	855	1140	61	17	623	33
Benzo(b)fluoranthene	855	1030	47	855	1100	54	6	630	44
Benzo(g,h,i)perylene	855	505	29	855	557	35	10	259	33
Benzo(k)fluoranthene	855	828	27	855	1130	62	31	601 M1	37
Chrysene	855	1010	33	855	1110	45	10	720 M1	38
Dibenz(a,h)anthracene	855	504	48	855	528	50	5	97.1	27
Fluoranthene	855	1340	0	855	1640	36	20	1330 M1	50
Fluorene	855	516	48	855	571	54	10	104	32
Indeno(1,2,3-cd)pyrene	855	547	33	855	593	38	8	264	28
Naphthalene	855	439	40	855	513	48	15	98.6	40
Phenanthrene	855	970	20	855	1210	48	22	800 M1	46
Pyrene	855	1250	5	855	1530	37	20	1210 M1	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 091813650

<i>Analyte</i>	<i>MS Sample ID: 091813650</i>			<i>MSD Sample ID: 091813650</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	402	351	79	402	363	82	3	34.9	35
Acenaphthene	402	346	83	402	349	83	1	13.8 J	35
Acenaphthylene	402	337	82	402	338	82	0	10.1 U	25
Anthracene	402	355	82	402	356	82	0	24.3	38
Benzo(a)anthracene	402	331	74	402	336	75	2	35.4	30
Benzo(a)pyrene	402	371	83	402	381	86	3	37.5	33
Benzo(b)fluoranthene	402	405	91	402	404	91	0	37.1	44
Benzo(g,h,i)perylene	402	342	79	402	348	80	2	24.5	33
Benzo(k)fluoranthene	402	308	69	402	314	71	2	29.6	37
Chrysene	402	346	74	402	351	75	1	50.3	38
Dibenz(a,h)anthracene	402	347	84	402	345	84	0	10.1 U	27
Fluoranthene	402	360	68	402	361	68	0	85.8	50
Fluorene	402	346	83	402	348	83	1	14.0 J	32
Indeno(1,2,3-cd)pyrene	402	348	82	402	350	82	1	20.0 J	28
Naphthalene	402	292	67	402	312	73	7	20.7	40
Phenanthrene	402	379	73	402	382	73	1	87.7	46
Pyrene	402	351	67	402	360	69	3	82.7	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 091813657

Analyte	MS Sample ID: 091813657			MSD Sample ID: 091813657			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	769	924	47	769	811	33	13	560 M1	35
Acenaphthene	769	621	57	769	620	57	0	180 J	35
Acenaphthylene	769	582	56	769	545	51	7	151 J	25
Anthracene	769	808	42	769	694	27	15	483 M1	38
Benzo(a)anthracene	769	1210	17	769	970	-14	22	1080 M1	30
Benzo(a)pyrene	769	1520	35	769	1170	-11	26	1260 M1	33
Benzo(b)fluoranthene	769	1410	28	769	1320	16	7	1200 M1	44
Benzo(g,h,i)perylene	769	1140	35	769	918	6	22	871 M1	33
Benzo(k)fluoranthene	769	1480	20	769	973	-46	41	1330 M1, R1	37
Chrysene	769	1530	-2	769	1210	-43	23	1540 M1	38
Dibenz(a,h)anthracene	769	847	71	769	705	52	18	303	27
Fluoranthene	769	2510	-50	769	1860	-134	30	2900 M1	50
Fluorene	769	699	58	769	614	47	13	255	32
Indeno(1,2,3-cd)pyrene	769	1070	39	769	860	11	22	777 M1	28
Naphthalene	769	734	54	769	674	46	9	321	40
Phenanthrene	769	1810	-9	769	1380	-64	27	1880 M1	46
Pyrene	769	2170	-30	769	1630	-101	28	2400 M1	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 091913713

<i>Analyte</i>	<i>MS Sample ID: 091913713</i>			<i>MSD Sample ID: 091913713</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Recy (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	397	555	-19	397	710	20	25	632 M1	35
Acenaphthene	397	409	13	397	540	46	28	357 M1	35
Acenaphthylene	397	312	65	397	341	73	9	99.4 U	25
Anthracene	397	411	41	397	497	63	19	248	38
Benzo(a)anthracene	397	354	54	397	402	66	13	141 J	30
Benzo(a)pyrene	397	379	65	397	439	80	15	120 J	33
Benzo(b)fluoranthene	397	355	75	397	409	89	14	99.4 U	44
Benzo(g,h,i)perylene	397	347	75	397	394	87	13	99.4 U	33
Benzo(k)fluoranthene	397	333	64	397	364	72	9	76.8 J	37
Chrysene	397	360	54	397	434	73	19	145 J	38
Dibenz(a,h)anthracene	397	333	80	397	362	88	8	99.4 U	27
Fluoranthene	397	393	39	397	488	63	22	238	50
Fluorene	397	370	45	397	464	69	22	190 J	32
Indeno(1,2,3-cd)pyrene	397	344	77	397	377	86	9	99.4 U	28
Naphthalene	397	4970	801	397	4940	794	1	1780 M1	40
Phenanthrene	397	550	-31	397	811	35	38	673 M1	46
Pyrene	397	418	25	397	551	58	28	319	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 091913730

<i>Analyte</i>	<i>MS Sample ID: 091913730</i>			<i>MSD Sample ID: 091913730</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	597	16000	-3960	597	5550	-5710		39600 M6	35
Acenaphthene	597	10000	-2990	597	3680	-4050		27800 M6	35
Acenaphthylene	597	2980 U	-291	597	856	-387		3170 JM6	25
Anthracene	597	7310	-1950	597	3070	-2660		18900 M6	38
Benzo(a)anthracene	597	4380 J	-890	597	2250	-1250		9690 M6	30
Benzo(a)pyrene	597	4060 J	-998	597	1870	-1370		10000 M6	33
Benzo(b)fluoranthene	597	2980 U	-368	597	1110	-512		4160 JM6	44
Benzo(g,h,i)perylene	597	2980 U	-521	597	1120	-701		5300 JM6	33
Benzo(k)fluoranthene	597	2530 J	-577	597	1330	-778		5970 M6	37
Chrysene	597	4450 J	-982	597	2190	-1360		10300 M6	38
Dibenz(a,h)anthracene	597	2980 U	-40	597	637	-104		2980 UM6	27
Fluoranthene	597	7680	-1920	597	3170	-2680		19100 M6	50
Fluorene	597	5680 J	-1230	597	2060	-1840		13000 M6	32
Indeno(1,2,3-cd)pyrene	597	2980 U	-313	597	867	-436		3470 JM6	28
Naphthalene	597	72800	-4060	597	25400	-12000	96	97000 M6, R1	40
Phenanthrene	597	18500	-5310	597	7230	-7200	88	50200 M6, R1	46
Pyrene	597	12300	-2540	597	4230	-3890		27400 M6	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 092313758

<i>Analyte</i>	<i>MS Sample ID: 092313758</i>			<i>MSD Sample ID: 092313758</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	390	342	72	390	321	67	6	60.3	35
Acenaphthene	390	322	72	390	305	67	5	42.1	35
Acenaphthylene	390	295	72	390	292	71	1	15.4 J	25
Anthracene	390	355	76	390	326	68	9	59.8	38
Benzo(a)anthracene	390	348	60	390	313	51	11	113	30
Benzo(a)pyrene	390	394	67	390	383	65	3	131	33
Benzo(b)fluoranthene	390	357	61	390	383	67	7	121	44
Benzo(g,h,i)perylene	390	347	69	390	347	69	0	77.3	33
Benzo(k)fluoranthene	390	365	70	390	326	60	11	91.9	37
Chrysene	390	379	59	390	338	48	11	149	38
Dibenz(a,h)anthracene	390	319	75	390	330	78	3	25.5	27
Fluoranthene	390	453	45	390	384	28	16	277 M1	50
Fluorene	390	321	72	390	304	68	6	38.4	32
Indeno(1,2,3-cd)pyrene	390	331	68	390	334	69	1	64.4	28
Naphthalene	390	271	63	390	309	73	13	24.4	40
Phenanthrene	390	464	56	390	379	34	20	247	46
Pyrene	390	423	45	390	361	30	16	246	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 092413814

<i>Analyte</i>	<i>MS Sample ID: 092413814</i>			<i>MSD Sample ID: 092413814</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	846	532	38	846	390	22	31	207 M1	35
Acenaphthene	846	659	60	846	417	31	45	150 JR1	35
Acenaphthylene	846	646	60	846	436	35	39	139 JR1	25
Anthracene	846	973	70	846	656	32	39	384 M1, R1	38
Benzo(a)anthracene	846	1620	72	846	1200	23	30	1010 M1	30
Benzo(a)pyrene	846	2060	86	846	1560	28	27	1330 M1	33
Benzo(b)fluoranthene	846	2010	88	846	1550	33	26	1270	44
Benzo(g,h,i)perylene	846	1470	69	846	1150	32	24	881	33
Benzo(k)fluoranthene	846	1680	68	846	1270	21	27	1100 M1	37
Chrysene	846	2050	79	846	1530	17	29	1380 M1	38
Dibenz(a,h)anthracene	846	1040	89	846	749	54	33	288 R1	27
Fluoranthene	846	3120	73	846	2240	-31	33	2510 M1	50
Fluorene	846	732	62	846	475	31	43	210 M1, R1	32
Indeno(1,2,3-cd)pyrene	846	1340	71	846	1020	33	27	738	28
Naphthalene	846	620	-19	846	457	-38	30	781 M1	40
Phenanthrene	846	2020	67	846	1360	-11	39	1450 M1	46
Pyrene	846	2680	67	846	1920	-22	33	2110 M1	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 092513017

Analyte	MS Sample ID: 092513017			MSD Sample ID: 092513017			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	723	857	63	723	1030	87	19	401	35
Acenaphthene	723	769	73	723	813	79	6	239	35
Acenaphthylene	723	752	77	723	757	77	1	197	25
Anthracene	723	1180	69	723	1320	88	11	686	38
Benzo(a)anthracene	723	1840	72	723	1950	87	5	1320	30
Benzo(a)pyrene	723	2150	100	723	2180	104	1	1430	33
Benzo(b)fluoranthene	723	2080	102	723	2370	141	13	1350 1q	44
Benzo(g,h,i)perylene	723	1160	68	723	1080	57	7	668	33
Benzo(k)fluoranthene	723	1880	68	723	1840	62	2	1390 1q	37
Chrysene	723	2460	87	723	2590	105	5	1830	38
Dibenz(a,h)anthracene	723	884	89	723	857	85	3	242	27
Fluoranthene	723	3880	63	723	4290	119	10	3430	50
Fluorene	723	870	69	723	954	81	9	372	32
Indeno(1,2,3-cd)pyrene	723	1130	66	723	1100	62	3	652	28
Naphthalene	723	790	54	723	986	81	22	400	40
Phenanthrene	723	2750	54	723	3220	118	16	2370	46
Pyrene	723	3470	69	723	3880	125	11	2970	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 092713101

Analyte	MS Sample ID: 092713101			MSD Sample ID: 092713101			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	639	5590	37	639	7700	367	32	5350 M6	35
Acenaphthene	639	2880	-28	639	4470	220	43	3060 M6, R1	35
Acenaphthylene	639	981	51	639	1180	82	18	654	25
Anthracene	639	2270	-48	639	3520	148	43	2580 M6, R1	38
Benzo(a)anthracene	639	2540	-97	639	3910	118	43	3160 M6, R1	30
Benzo(a)pyrene	639	2840	-34	639	4050	155	35	3060 M6, R1	33
Benzo(b)fluoranthene	639	2880	-32	639	3570	77	22	3080 M6	44
Benzo(g,h,i)perylene	639	1710	36	639	2300	129	30	1480	33
Benzo(k)fluoranthene	639	2130	-34	639	3650	203	53	2350 M6, R1	37
Chrysene	639	3310	-84	639	4750	142	36	3840 M6	38
Dibenz(a,h)anthracene	639	895	47	639	1060	72	17	596 J	27
Fluoranthene	639	5430	-283	639	9100	290	50	7240 M6	50
Fluorene	639	1940	-23	639	3140	164	47	2090 M6, R1	32
Indeno(1,2,3-cd)pyrene	639	1560	24	639	2150	117	32	1400 R1	28
Naphthalene	639	12700	34	639	15000	400	17	12400 M6	40
Phenanthrene	639	6810	-328	639	11600	417	52	8910 M6, R1	46
Pyrene	639	5600	-211	639	8590	257	42	6940 M6	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 100213181

Analyte	MS Sample ID: 100213181			MSD Sample ID: 100213181			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	393	460	90	393	317	54	37	111	35
Acenaphthene	393	423	93	393	310	64	31	46.2	35
Acenaphthylene	393	312	78	393	282	70	10	9.8 U	25
Anthracene	393	441	103	393	326	74	30	35.3	38
Benzo(a)anthracene	393	363	85	393	302	70	18	45.7	30
Benzo(a)pyrene	393	404	96	393	330	77	20	51.1	33
Benzo(b)fluoranthene	393	338	82	393	289	69	16	40.7 1q	44
Benzo(g,h,i)perylene	393	353	86	393	307	74	14	30.1	33
Benzo(k)fluoranthene	393	382	92	393	323	77	17	46.5 1q	37
Chrysene	393	385	89	393	320	73	18	65.4	38
Dibenz(a,h)anthracene	393	324	82	393	286	72	13	9.8 U	27
Fluoranthene	393	456	101	393	344	73	28	112	50
Fluorene	393	382	91	393	308	72	22	22.9	32
Indeno(1,2,3-cd)pyrene	393	334	82	393	298	73	11	24.7	28
Naphthalene	393	1090	109	393	555	-26	65	874	40
Phenanthrene	393	591	121	393	406	74	37	132	46
Pyrene	393	492	105	393	359	72	31	116	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 100213197

Analyte	MS Sample ID: 100213197			MSD Sample ID: 100213197			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	1420	1660	82	1420	1430	66	15	711 U	35
Acenaphthene	1420	2680	131	1420	1490	48	57	815 JM6, R1	35
Acenaphthylene	1420	1500	71	1420	1620	80	8	711 U	25
Anthracene	1420	5200	218	1420	2660	39	64	2100 M6, R1	38
Benzo(a)anthracene	1420	8640	258	1420	4510	-32	63	4970 M6, R1	30
Benzo(a)pyrene	1420	10400	290	1420	5390	-65	64	6310 M6, R1	33
Benzo(b)fluoranthene	1420	10900	321	1420	5260	-73	69	6300 M6, R1	44
Benzo(g,h,i)perylene	1420	7080	221	1420	3790	-10	60	3940 M6, R1	33
Benzo(k)fluoranthene	1420	7490	181	1420	4520	-28	49	4920 M6, R1	37
Chrysene	1420	10400	295	1420	5560	-42	60	6160 M6, R1	38
Dibenz(a,h)anthracene	1420	2860	112	1420	1870	43	42	1270 JR1	27
Fluoranthene	1420	21200	660	1420	8990	-200	81	11800 M6, R1	50
Fluorene	1420	2690	119	1420	1790	56	40	999 JR1	32
Indeno(1,2,3-cd)pyrene	1420	6130	190	1420	3310	-9	60	3440 M6, R1	28
Naphthalene	1420	2290	97	1420	1600	48	36	917 J	40
Phenanthrene	1420	16000	553	1420	6490	-116	85	8130 M6, R1	46
Pyrene	1420	17400	537	1420	7640	-148	78	9740 M6, R1	49

Table 3-25. Sediment Method 8270 SIM MS/MSD Recoveries Sample 100213178

Analyte	MS Sample ID: 100213178			MSD Sample ID: 100213178			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	364	181	49	364	188	51	4	183	35
Acenaphthene	364	207	57	364	206	56	1	137	35
Acenaphthylene	364	196	54	364	211	58	8	39.3 U	25
Anthracene	364	218	59	364	249	68	13	102	38
Benzo(a)anthracene	364	192	50	364	294	78	42	92.4	30
Benzo(a)pyrene	364	215	57	364	298	80	32	96.0	33
Benzo(b)fluoranthene	364	204	54	364	321	87	45	62.7 J	44
Benzo(g,h,i)perylene	364	188	51	364	212	57	12	55.2 J	33
Benzo(k)fluoranthene	364	219	58	364	249	66	13	79.7	37
Chrysene	364	206	54	364	299	80	37	111	38
Dibenz(a,h)anthracene	364	196	54	364	221	61	12	39.3 U	27
Fluoranthene	364	213	54	364	353	92	49	212	50
Fluorene	364	202	56	364	217	60	7	65.1 J	32
Indeno(1,2,3-cd)pyrene	364	190	51	364	219	59	14	39.3 U	28
Naphthalene	364	174	47	364	184	50	6	1010 5q	40
Phenanthrene	364	205	53	364	307	82	40	329	46
Pyrene	364	218	56	364	341	90	44	255	49

3.3.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. Two LCSs had an analyte recover low. Positive results for the failed analytes in the batches are qualified as estimated ("J") while non-detects will be qualified as ("R").

The laboratory control sample results are given in Tables 3-26 and 27.

Table 3-26. Sediment Method 8270-SIM LCS Results Summary

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 139060</i>			<i>QC Batch: 139239</i>			<i>QC Batch: 139369</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	259	78	333	235	71	333	195	59
Acenaphthene	55	130	333	283	85	333	237	71	333	212	63
Acenaphthylene	55	130	333	276	83	333	238	71	333	213	64
Anthracene	66	130	333	315	95	333	262	79	333	241	72
Benzo(a)anthracene	55	130	333	273	82	333	233	70	333	214	64
Benzo(a)pyrene	56	130	333	282	85	333	251	75	333	230	69
Benzo(b)fluoranthene	53	130	333	283	85	333	234	70	333	213	64
Benzo(g,h,i)perylene	51	130	333	263	79	333	241	72	333	239	72
Benzo(k)fluoranthene	52	130	333	286	86	333	257	77	333	239	72
Chrysene	58	130	333	317	95	333	240	72	333	225	67
Dibenz(a,h)anthracene	55	130	333	244	73	333	251	75	333	245	73
Fluoranthene	62	130	333	300	90	333	256	77	333	235	70
Fluorene	58	130	333	278	83	333	248	75	333	224	67
Indeno(1,2,3-cd)pyrene	54	130	333	247	74	333	249	75	333	240	72
Naphthalene	41	130	333	234	70	333	209	63	333	169	51
Phenanthrene	60	130	333	285	85	333	248	74	333	226	68
Pyrene	51	130	333	302	91	333	237	71	333	214	64

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 1

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 139489</i>			<i>QC Batch: 139519</i>			<i>QC Batch: 139614</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	205	61	333	190	57	333	248	74
Acenaphthene	55	130	333	217	65	333	211	63	333	244	73
Acenaphthylene	55	130	333	220	66	333	209	63	333	260	78
Anthracene	66	130	333	269	81	333	243	73	333	311	93
Benzo(a)anthracene	55	130	333	211	63	333	204	61	333	259	78
Benzo(a)pyrene	56	130	333	214	64	333	210	63	333	242	73
Benzo(b)fluoranthene	53	130	333	202	60	333	199	60	333	285	85
Benzo(g,h,i)perylene	51	130	333	218	66	333	214	64	333	280	84
Benzo(k)fluoranthene	52	130	333	211	63	333	206	62	333	248	74
Chrysene	58	130	333	228	68	333	217	65	333	281	84
Dibenz(a,h)anthracene	55	130	333	220	66	333	214	64	333	280	84
Fluoranthene	62	130	333	244	73	333	219	66	333	284	85
Fluorene	58	130	333	227	68	333	214	64	333	274	82
Indeno(1,2,3-cd)pyrene	54	130	333	219	66	333	214	64	333	278	83
Naphthalene	41	130	333	179	54	333	166	50	333	221	66
Phenanthrene	60	130	333	235	70	333	208	63	333	267	80
Pyrene	51	130	333	230	69	333	221	66	333	261	78

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 2

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 139772</i>			<i>QC Batch: 140252</i>			<i>QC Batch: 140497</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	222	67	333	192	58	333	203	61
Acenaphthene	55	130	333	234	70	333	222	67	333	211	63
Acenaphthylene	55	130	333	236	71	333	210	63	333	210	63
Anthracene	66	130	333	265	80	333	234	70	333	235	70
Benzo(a)anthracene	55	130	333	240	72	333	215	65	333	201	60
Benzo(a)pyrene	56	130	333	266	80	333	227	68	333	221	66
Benzo(b)fluoranthene	53	130	333	256	77	333	246	74	333	222	67
Benzo(g,h,i)perylene	51	130	333	260	78	333	225	67	333	207	62
Benzo(k)fluoranthene	52	130	333	255	76	333	206	62	333	200	60
Chrysene	58	130	333	243	73	333	228	68	333	211	63
Dibenz(a,h)anthracene	55	130	333	268	80	333	223	67	333	220	66
Fluoranthene	62	130	333	252	76	333	227	68	333	221	66
Fluorene	58	130	333	245	74	333	226	68	333	217	65
Indeno(1,2,3-cd)pyrene	54	130	333	260	78	333	217	65	333	210	63
Naphthalene	41	130	333	215	64	333	171	51	333	189	57
Phenanthrene	60	130	333	248	74	333	223	67	333	220	66
Pyrene	51	130	333	242	73	333	218	65	333	211	63

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 3

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 140554</i>			<i>QC Batch: 140724</i>			<i>QC Batch: 140747</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	190	57	333	217	65	333	206	62
Acenaphthene	55	130	333	198	59	333	232	70	333	207	62
Acenaphthylene	55	130	333	197	59	333	230	69	333	207	62
Anthracene	66	130	333	218	66	333	256	77	333	244	73
Benzo(a)anthracene	55	130	333	188	56	333	216	65	333	199	60
Benzo(a)pyrene	56	130	333	206	62	333	235	71	333	218	65
Benzo(b)fluoranthene	53	130	333	215	64	333	239	72	333	216	65
Benzo(g,h,i)perylene	51	130	333	193	58	333	219	66	333	209	63
Benzo(k)fluoranthene	52	130	333	182	55	333	216	65	333	203	61
Chrysene	58	130	333	199	60	333	235	70	333	213	64
Dibenz(a,h)anthracene	55	130	333	205	61	333	227	68	333	216	65
Fluoranthene	62	130	333	206	62	333	235	70	333	225	68
Fluorene	58	130	333	203	61	333	241	72	333	219	66
Indeno(1,2,3-cd)pyrene	54	130	333	195	58	333	220	66	333	209	63
Naphthalene	41	130	333	172	52	333	201	60	333	191	57
Phenanthrene	60	130	333	205	62	333	232	70	333	220	66
Pyrene	51	130	333	198	59	333	234	70	333	211	63

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 4

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 140771</i>			<i>QC Batch: 141049</i>			<i>QC Batch: 141129</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	209	63	333	196	59	333	239	72
Acenaphthene	55	130	333	210	63	333	213	64	333	253	76
Acenaphthylene	55	130	333	211	63	333	208	62	333	248	74
Anthracene	66	130	333	230	69	333	239	72	333	267	80
Benzo(a)anthracene	55	130	333	200	60	333	194	58	333	245	74
Benzo(a)pyrene	56	130	333	234	70	333	192	58	333	249	75
Benzo(b)fluoranthene	53	130	333	195	58	333	228	68	333	254	76
Benzo(g,h,i)perylene	51	130	333	215	64	333	210	63	333	251	75
Benzo(k)fluoranthene	52	130	333	232	69	333	213	64	333	251	75
Chrysene	58	130	333	211	63	333	232	70	333	255	76
Dibenz(a,h)anthracene	55	130	333	220	66	333	216	65	333	257	77
Fluoranthene	62	130	333	208	62	333	220	66	333	255	77
Fluorene	58	130	333	216	65	333	220	66	333	260	78
Indeno(1,2,3-cd)pyrene	54	130	333	210	63	333	207	62	333	250	75
Naphthalene	41	130	333	187	56	333	167	50	333	204	61
Phenanthrene	60	130	333	213	64	333	209	63	333	265	79
Pyrene	51	130	333	225	68	333	209	63	333	254	76

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 5

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 141130</i>			<i>QC Batch: 141131</i>			<i>QC Batch: 141337</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	265	80	333	206	62	333	254	76
Acenaphthene	55	130	333	273	82	333	213	64	333	268	80
Acenaphthylene	55	130	333	272	82	333	213	64	333	270	81
Anthracene	66	130	333	284	85	333	237	71	333	281	84
Benzo(a)anthracene	55	130	333	260	78	333	217	65	333	256	77
Benzo(a)pyrene	56	130	333	265	80	333	231	69	333	260	78
Benzo(b)fluoranthene	53	130	333	280	84	333	241	72	333	275	82
Benzo(g,h,i)perylene	51	130	333	275	83	333	222	67	333	270	81
Benzo(k)fluoranthene	52	130	333	263	79	333	208	62	333	255	76
Chrysene	58	130	333	274	82	333	225	67	333	268	80
Dibenz(a,h)anthracene	55	130	333	278	83	333	230	69	333	273	82
Fluoranthene	62	130	333	272	82	333	231	69	333	267	80
Fluorene	58	130	333	283	85	333	227	68	333	278	83
Indeno(1,2,3-cd)pyrene	54	130	333	271	81	333	222	66	333	267	80
Naphthalene	41	130	333	231	69	333	175	53	333	222	67
Phenanthrene	60	130	333	279	84	333	232	70	333	274	82
Pyrene	51	130	333	271	81	333	218	66	333	264	79

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 6

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 141833</i>			<i>QC Batch: 141992</i>			<i>QC Batch: 141998</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	240	72	333	364	109	333	273	82
Acenaphthene	55	130	333	245	74	333	276	83	333	205	61
Acenaphthylene	55	130	333	244	73	333	273	82	333	202	61
Anthracene	66	130	333	264	79	333	294	88	333	222	67
Benzo(a)anthracene	55	130	333	232	70	333	266	80	333	207	62
Benzo(a)pyrene	56	130	333	262	79	333	282	85	333	239	72
Benzo(b)fluoranthene	53	130	333	267	80	333	342	103	333	225	68
Benzo(g,h,i)perylene	51	130	333	254	76	333	304	91	333	237	71
Benzo(k)fluoranthene	52	130	333	245	74	333	255	76	333	228	68
Chrysene	58	130	333	244	73	333	279	84	333	217	65
Dibenz(a,h)anthracene	55	130	333	262	78	333	312	94	333	241	72
Fluoranthene	62	130	333	251	75	333	284	85	333	214	64
Fluorene	58	130	333	251	75	333	286	86	333	216	65
Indeno(1,2,3-cd)pyrene	54	130	333	250	75	333	300	90	333	234	70
Naphthalene	41	130	333	230	69	333	317	95	333	237	71
Phenanthrene	60	130	333	251	75	333	289	87	333	219	66
Pyrene	51	130	333	237	71	333	268	80	333	209	63

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 7

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 142166</i>			<i>QC Batch: 142167</i>			<i>QC Batch: 142333</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	311	93	333	244	73	333	197	59
Acenaphthene	55	130	333	278	83	333	244	73	333	207	62
Acenaphthylene	55	130	333	277	83	333	245	74	333	202	60
Anthracene	66	130	333	301	90	333	266	80	333	227	68
Benzo(a)anthracene	55	130	333	277	83	333	234	70	333	203	61
Benzo(a)pyrene	56	130	333	297	89	333	247	74	333	247	74
Benzo(b)fluoranthene	53	130	333	329	99	333	289	87	333	248	74
Benzo(g,h,i)perylene	51	130	333	240	72	333	275	82	333	250	75
Benzo(k)fluoranthene	52	130	333	290	87	333	237	71	333	206	62
Chrysene	58	130	333	287	86	333	254	76	333	221	66
Dibenz(a,h)anthracene	55	130	333	274	82	333	281	84	333	248	74
Fluoranthene	62	130	333	283	85	333	246	74	333	206	62
Fluorene	58	130	333	286	86	333	253	76	333	214	64
Indeno(1,2,3-cd)pyrene	54	130	333	259	78	333	270	81	333	242	73
Naphthalene	41	130	333	284	85	333	223	67	333	174	52
Phenanthrene	60	130	333	290	87	333	248	74	333	211	63
Pyrene	51	130	333	292	88	333	259	78	333	209	63

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 8

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 142498</i>			<i>QC Batch: 142511</i>			<i>QC Batch: 142657</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	223	67	333	192	58	333	252	76
Acenaphthene	55	130	333	250	75	333	222	66	333	286	86
Acenaphthylene	55	130	333	243	73	333	216	65	333	273	82
Anthracene	66	130	333	288	86	333	253	76	333	314	94
Benzo(a)anthracene	55	130	333	262	79	333	222	66	333	276	83
Benzo(a)pyrene	56	130	333	315	94	333	270	81	333	330	99
Benzo(b)fluoranthene	53	130	333	318	96	333	272	82	333	277	83
Benzo(g,h,i)perylene	51	130	333	309	93	333	257	77	333	323	97
Benzo(k)fluoranthene	52	130	333	264	79	333	225	68	333	333	100
Chrysene	58	130	333	282	85	333	248	74	333	312	94
Dibenz(a,h)anthracene	55	130	333	315	94	333	258	77	333	321	96
Fluoranthene	62	130	333	273	82	333	233	70	333	290	87
Fluorene	58	130	333	266	80	333	232	70	333	296	89
Indeno(1,2,3-cd)pyrene	54	130	333	303	91	333	249	75	333	312	93
Naphthalene	41	130	333	196	59	333	153	46	333	208	63
Phenanthrene	60	130	333	271	81	333	232	70	333	286	86
Pyrene	51	130	333	260	78	333	223	67	333	285	85

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 9

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 142773</i>			<i>QC Batch: 142819</i>			<i>QC Batch: 142857</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	290	87	333	209	63	333	243	73
Acenaphthene	55	130	333	295	88	333	219	66	333	239	72
Acenaphthylene	55	130	333	287	86	333	216	65	333	236	71
Anthracene	66	130	333	341	102	333	257	77	333	262	79
Benzo(a)anthracene	55	130	333	302	90	333	233	70	333	238	71
Benzo(a)pyrene	56	130	333	362	109	333	281	84	333	292	88
Benzo(b)fluoranthene	53	130	333	301	90	333	243	73	333	267	80
Benzo(g,h,i)perylene	51	130	333	341	102	333	262	79	333	271	81
Benzo(k)fluoranthene	52	130	333	356	107	333	261	78	333	264	79
Chrysene	58	130	333	330	99	333	257	77	333	259	78
Dibenz(a,h)anthracene	55	130	333	340	102	333	263	79	333	273	82
Fluoranthene	62	130	333	325	98	333	243	73	333	254	76
Fluorene	58	130	333	319	96	333	239	72	333	251	75
Indeno(1,2,3-cd)pyrene	54	130	333	329	99	333	252	76	333	264	79
Naphthalene	41	130	333	270	81	333	192	58	333	235	70
Phenanthrene	60	130	333	329	99	333	243	73	333	243	73
Pyrene	51	130	333	339	102	333	261	78	333	244	73

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 10

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 143284</i>			<i>QC Batch: 143614</i>			<i>QC Batch: 143680</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	256	77	333	258	77	333	233	70
Acenaphthene	55	130	333	279	84	333	295	88	333	251	75
Acenaphthylene	55	130	333	273	82	333	288	86	333	246	74
Anthracene	66	130	333	294	88	333	333	100	333	267	80
Benzo(a)anthracene	55	130	333	267	80	333	280	84	333	238	71
Benzo(a)pyrene	56	130	333	299	90	333	289	87	333	242	73
Benzo(b)fluoranthene	53	130	333	277	83	333	323	97	333	272	82
Benzo(g,h,i)perylene	51	130	333	302	91	333	296	89	333	249	75
Benzo(k)fluoranthene	52	130	333	301	90	333	294	88	333	248	74
Chrysene	58	130	333	277	83	333	298	89	333	259	78
Dibenz(a,h)anthracene	55	130	333	311	93	333	296	89	333	244	73
Fluoranthene	62	130	333	273	82	333	309	93	333	251	75
Fluorene	58	130	333	287	86	333	301	90	333	256	77
Indeno(1,2,3-cd)pyrene	54	130	333	300	90	333	293	88	333	241	72
Naphthalene	41	130	333	223	67	333	234	70	333	210	63
Phenanthrene	60	130	333	272	82	333	310	93	333	250	75
Pyrene	51	130	333	274	82	333	294	88	333	254	76

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 11

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 143702</i>			<i>QC Batch: 143912</i>			<i>QC Batch: 143976</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	48	130	333	247	74	333	168	51	333	184	55
Acenaphthene	55	130	333	288	87	333	219	66	333	221	66
Acenaphthylene	55	130	333	282	85	333	206	62	333	212	63
Anthracene	66	130	333	313	94	333	268	81	333	239	72
Benzo(a)anthracene	55	130	333	291	87	333	239	72	333	215	64
Benzo(a)pyrene	56	130	333	366	110	333	305	91	333	248	74
Benzo(b)fluoranthene	53	130	333	370	111	333	314	94	333	246	74
Benzo(g,h,i)perylene	51	130	333	351	105	333	324	97	333	252	76
Benzo(k)fluoranthene	52	130	333	319	96	333	309	93	333	237	71
Chrysene	58	130	333	308	93	333	252	76	333	226	68
Dibenz(a,h)anthracene	55	130	333	352	106	333	322	97	333	246	74
Fluoranthene	62	130	333	302	91	333	251	75	333	218	65
Fluorene	58	130	333	300	90	333	232	70	333	220	66
Indeno(1,2,3-cd)pyrene	54	130	333	342	103	333	316	95	333	245	73
Naphthalene	41	130	333	243	73	333	141	42	333	172	52
Phenanthrene	60	130	333	297	89	333	252	76	333	223	67
Pyrene	51	130	333	298	89	333	249	75	333	221	66

Table 3-26. Sediment Method 8270-SIM LCS Results Summary Cont 12

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 144142</i>			<i>QC Batch: 144280</i>		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	48	130	333	184	55	333	174	52
Acenaphthene	55	130	333	217	65	333	206	62
Acenaphthylene	55	130	333	204	61	333	192	58
Anthracene	66	130	333	229	69	333	233	70
Benzo(a)anthracene	55	130	333	192	57	333	203	61
Benzo(a)pyrene	56	130	333	216	65	333	227	68
Benzo(b)fluoranthene	53	130	333	200	60	333	224	67
Benzo(g,h,i)perylene	51	130	333	204	61	333	166	50
Benzo(k)fluoranthene	52	130	333	227	68	333	232	69
Chrysene	58	130	333	213	64	333	222	67
Dibenz(a,h)anthracene	55	130	333	207	62	333	199	60
Fluoranthene	62	130	333	206	62	333	219	66
Fluorene	58	130	333	210	63	333	210	63
Indeno(1,2,3-cd)pyrene	54	130	333	203	61	333	187	56
Naphthalene	41	130	333	191	57	333	169	51
Phenanthrene	60	130	333	198	59	333	208	62
Pyrene	51	130	333	200	60	333	229	69

Table 3-27. Water Method 8270-SIM LCS Results Summary

Analyte	Rec Limits (%)		QC Batch: 200-60761			QC Batch: 200-60767			QC Batch: 200-61230		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2-Methylnaphthalene	55	105	0.4	0.348	87	0.4	0.324	81	0.400	0.309	77
Acenaphthene	55	110	0.4	0.306	77	0.4	0.322	80	0.400	0.330	82
Acenaphthylene	55	110	0.4	0.331	83	0.4	0.345	86	0.400	0.357	89
Anthracene	55	110	0.4	0.295	74	0.4	0.332	83	0.400	0.339	85
Benzo(a)anthracene	55	120	0.4	0.35	87	0.4	0.403	101	0.400	0.398	99
Benzo(a)pyrene	55	120	0.4	0.312 ^	78	0.4	0.344 ^	86	0.400	0.378	95
Benzo(b)fluoranthene	45	120	0.4	0.4	100	0.4	0.392	98	0.400	0.393	98
Benzo(g,h,i)perylene	30	125	0.4	0.149	37	0.4	0.309	77	0.400	0.350	87
Benzo(k)fluoranthene	45	120	0.4	0.287	72	0.4	0.312	78	0.400	0.319	80
Chrysene	45	115	0.4	0.271	68	0.4	0.309	77	0.400	0.314	79
Dibenz(a,h)anthracene	30	130	0.4	0.198	49	0.4	0.328	82	0.400	0.372	93
Fluoranthene	45	120	0.4	0.307	77	0.4	0.345	86	0.400	0.355	89
Fluorene	55	110	0.4	0.322	81	0.4	0.339	85	0.400	0.334	83
Indeno(1,2,3-cd)pyrene	30	130	0.4	0.184	46	0.4	0.324	81	0.400	0.359	90
Naphthalene	50	105	0.4	0.307	77	0.4	0.306	77	0.400	0.312	78
Phenanthrene	50	110	0.4	0.293	73	0.4	0.33	82	0.400	0.327	82
Pyrene	50	115	0.4	0.304 ^	76	0.4	0.355 ^	89	0.400	0.373	93

Table 3-27. Water Method 8270-SIM LCS Results Summary Cont 1

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 200-61374</i>			<i>QC Batch: 200-62265</i>			<i>QC Batch: 200-62266</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/L)</i>	<i>Result (µg/L)</i>	<i>Rec (%)</i>	<i>Spike (µg/L)</i>	<i>Result (µg/L)</i>	<i>Rec (%)</i>	<i>Spike (µg/L)</i>	<i>Result (µg/L)</i>	<i>Rec (%)</i>
2-Methylnaphthalene	55	105	0.400	0.324	81	0.400	0.330	82	0.400	0.333	83
Acenaphthene	55	110	0.400	0.329	82	0.400	0.327	82	0.400	0.331	83
Acenaphthylene	55	110	0.400	0.346	86	0.400	0.369	92	0.400	0.369	92
Anthracene	55	110	0.400	0.334	84	0.400	0.343	86	0.400	0.341	85
Benzo(a)anthracene	55	120	0.400	0.377	94	0.400	0.401	100	0.400	0.401	100
Benzo(a)pyrene	55	120	0.400	0.360	90	0.400	0.372	93	0.400	0.374	93
Benzo(b)fluoranthene	45	120	0.400	0.415	104	0.400	0.399	100	0.400	0.427	107
Benzo(g,h,i)perylene	30	125	0.400	0.333	83	0.400	0.375	94	0.400	0.339	85
Benzo(k)fluoranthene	45	120	0.400	0.286	71	0.400	0.301	75	0.400	0.289	72
Chrysene	45	115	0.400	0.300	75	0.400	0.307	77	0.400	0.301	75
Dibenz(a,h)anthracene	30	130	0.400	0.373	93	0.400	0.417	104	0.400	0.383	96
Fluoranthene	45	120	0.400	0.348	87	0.400	0.362	90	0.400	0.355	89
Fluorene	55	110	0.400	0.330	83	0.400	0.336	84	0.400	0.338	85
Indeno(1,2,3-cd)pyrene	30	130	0.400	0.351	88	0.400	0.396	99	0.400	0.361	90
Naphthalene	50	105	0.400	0.327	82	0.400	0.317	79	0.400	0.316	79
Phenanthrene	50	110	0.400	0.315	79	0.400	0.318	80	0.400	0.323	81
Pyrene	50	115	0.400	0.319	80	0.400	0.306	76	0.400	0.331	83

Table 3-27. Water Method 8270-SIM LCS Results Summary Cont 2

Analyte	Rec Limits (%)		QC Batch: 200-62406			QC Batch: 200-62573		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Rec (%)	Spike (µg/L)	Result (µg/L)	Rec (%)
2-Methylnaphthalene	55	105	0.400	0.306	76	0.400	0.325	81
Acenaphthene	55	110	0.400	0.298	74	0.400	0.324	81
Acenaphthylene	55	110	0.400	0.302	75	0.400	0.365	91
Anthracene	55	110	0.400	0.304	76	0.400	0.346	87
Benzo(a)anthracene	55	120	0.400	0.350	87	0.400	0.406	101
Benzo(a)pyrene	55	120	0.400	0.324	81	0.400	0.381	95
Benzo(b)fluoranthene	45	120	0.400	0.371	93	0.400	0.400	100
Benzo(g,h,i)perylene	30	125	0.400	0.307	77	0.400	0.372	93
Benzo(k)fluoranthene	45	120	0.400	0.249	62	0.400	0.275	69
Chrysene	45	115	0.400	0.281	70	0.400	0.310	78
Dibenz(a,h)anthracene	30	130	0.400	0.340	85	0.400	0.407	102
Fluoranthene	45	120	0.400	0.312	78	0.400	0.371	93
Fluorene	55	110	0.400	0.303	76	0.400	0.337	84
Indeno(1,2,3-cd)pyrene	30	130	0.400	0.324	81	0.400	0.385	96
Naphthalene	50	105	0.400	0.300	75	0.400	0.317	79
Phenanthrene	50	110	0.400	0.293	73	0.400	0.322	80
Pyrene	50	115	0.400	0.309	77	0.400	0.319	80

Table 3-27. Water Method 8270-SIM LCS Results Summary Cont 3

<i>Analyte</i>	<i>Rec Limits (%)</i>		<i>QC Batch: 200-61229</i>			<i>QC Batch: 200-61971</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/L)</i>	<i>Result (µg/L)</i>	<i>Rec (%)</i>	<i>Spike (µg/L)</i>	<i>Result (µg/L)</i>	<i>Rec (%)</i>
2-Methylnaphthalene	55	105	0.4	0.334	84	0.400	0.333	83
	55	105	0.4	0.245	61	0.400	0.302	76
Acenaphthene	55	110	0.4	0.354	89	0.400	0.335	84
	55	110	0.4	0.269	67	0.400	0.316	79
Acenaphthylene	55	110	0.4	0.378	94	0.400	0.365	91
	55	110	0.4	0.297	74	0.400	0.347	87
Anthracene	55	110	0.4	0.359	90	0.400	0.343	86
	55	110	0.4	0.293	73	0.400	0.332	83
Benzo(a)anthracene	55	120	0.4	0.412	103	0.400	0.390	98
	55	120	0.4	0.358	90	0.400	0.378	94
Benzo(a)pyrene	55	120	0.4	0.395	99	0.400	0.380	95
	55	120	0.4	0.321	80	0.400	0.357	89
Benzo(b)fluoranthene	45	120	0.4	0.414	104	0.400	0.415	104
	45	120	0.4	0.37	92	0.400	0.404	101
Benzo(g,h,i)perylene	30	125	0.4	0.374	94	0.400	0.376	94
	30	125	0.4	0.343	86	0.400	0.349	87
Benzo(k)fluoranthene	45	120	0.4	0.32	80	0.400	0.320	80
	45	120	0.4	0.264	66	0.400	0.275	69
Chrysene	45	115	0.4	0.332	83	0.400	0.314	79
	45	115	0.4	0.282	70	0.400	0.295	74
Dibenz(a,h)anthracene	30	130	0.4	0.403	101	0.400	0.426	106
	30	130	0.4	0.366	91	0.400	0.395	99
Fluoranthene	45	120	0.4	0.38	95	0.400	0.374	93
	45	120	0.4	0.319	80	0.400	0.359	90
Fluorene	55	110	0.4	0.36	90	0.400	0.345	86
	55	110	0.4	0.284	71	0.400	0.330	83
Indeno(1,2,3-cd)pyrene	30	130	0.4	0.392	98	0.400	0.400	100
	30	130	0.4	0.349	87	0.400	0.366	92
Naphthalene	50	105	0.4	0.339	85	0.400	0.321	80
	50	105	0.4	0.246	62	0.400	0.296	74
Phenanthrene	50	110	0.4	0.344	86	0.400	0.335	84
	50	110	0.4	0.277	69	0.400	0.317	79
Pyrene	50	115	0.4	0.33	82	0.400	0.318	79
	50	115	0.4	0.271	68	0.400	0.291	73

3.3.8 Field Duplicates

Field duplicates generally did not exhibit good agreement for most of analytes with RPD values >30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. Many samples exceeded 30% at more than twice the limit of quantitation therefore, these analytes for these samples and their duplicate only will be qualified as estimated ("J").

The results of the field duplicate analyses are given in Table 3-28.

Table 3-28. Sediment Method 8270-SIM Field Duplicate Results

Analyte	Sample ID: 082613004			Sample ID: 082613023			RPD	Sample ID: 082813099			Sample ID: 082813106			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	375	U	750	127	J	196	NC	14.5	J	20.1	13.7	J	20.3	5.7
Acenaphthene	375	U	750	158	J	196	NC	10.1	U	20.1	10.2	U	20.3	0.0
Acenaphthylene	375	U	750	123	J	196	NC	10.1	U	20.1	10.2	U	20.3	0.0
Anthracene	506	J	750	469		196	7.6	10.1	U	20.1	10.2	U	20.3	0.0
Benzo(a)anthracene	1480		750	1150		196	25.1	13.3	J	20.1	12.2	J	20.3	8.6
Benzo(a)pyrene	1620		750	1410		196	13.9	11.3	J	20.1	12.4	J	20.3	9.3
Benzo(b)fluoranthene	1340		750	1400	1q	196	4.4	10.1	U	20.1	11.3	J	20.3	NC
Benzo(g,h,i)perylene	1040		750	898		196	14.7	10.1	U	20.1	10.2	U	20.3	0.0
Benzo(k)fluoranthene	1770		750	1100	1q	196	46.7	12.3	J	20.1	11.2	J	20.3	9.4
Chrysene	2010		750	1470		196	31.0	17.4	J	20.1	16.5	J	20.3	5.3
Dibenz(a,h)anthracene	375	U	750	293		196	24.6	10.1	U	20.1	10.2	U	20.3	0.0
Fluoranthene	3720		750	2790		196	28.6	28.3		20.1	23.0		20.3	20.7
Fluorene	375	U	750	180	J	196	NC	10.1	U	20.1	10.2	U	20.3	0.0
Indeno(1,2,3-cd)pyrene	929		750	775		196	18.1	10.1	U	20.1	10.2	U	20.3	0.0
Naphthalene	375	U	750	174	J	196	NC	10.1	U	20.1	10.2	U	20.3	0.0
Phenanthrene	1870		750	1510		196	21.3	30.9		20.1	25.5		20.3	19.1
Pyrene	3090		750	2330		196	28.0	25.6		20.1	21.3		20.3	18.3

Table 3-28. Sediment Method 8270-SIM Field Duplicate Results Cont 1

Analyte	Sample ID: 090913333			Sample ID: 090913334			RPD	Sample ID: 090913363			Sample ID: 091013421			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	97.4		20.3	63.6		20.2	42.0	641		341	283		161	77.5
Acenaphthene	37.7		20.3	32.1		20.2	16.0	750		341	167		161	127.2
Acenaphthylene	10.1	U	20.3	10.1	U	20.2	0.0	507		341	113	J	161	127.1
Anthracene	35.2		20.3	44.2		20.2	22.7	1470		341	416		161	111.8
Benzo(a)anthracene	23.6		20.3	24.7		20.2	4.6	2350		341	933		161	86.3
Benzo(a)pyrene	20.3		20.3	25.1		20.2	21.1	2610		341	1010		161	88.4
Benzo(b)fluoranthene	11.7	J	20.3	11.2	J	20.2	4.4	2540	1q	341	1160		161	74.6
Benzo(g,h,i)perylene	10.1	U	20.3	12.1	J	20.2	NC	887		341	533		161	49.9
Benzo(k)fluoranthene	13.3	J	20.3	17.3	J	20.2	26.1	2410	1q	341	961		161	86.0
Chrysene	27.0		20.3	30.2		20.2	11.2	3070		341	1400		161	74.7
Dibenz(a,h)anthracene	10.1	U	20.3	10.1	U	20.2	0.0	394		341	186		161	71.7
Fluoranthene	41.5		20.3	41.5		20.2	0.0	6570		341	2510		161	89.4
Fluorene	18.9	J	20.3	19.6	J	20.2	3.6	954		341	196		161	131.8
Indeno(1,2,3-cd)pyrene	10.1	U	20.3	10.1	U	20.2	0.0	951		341	497		161	62.7
Naphthalene	325		20.3	127		20.2	87.6	1180		341	187		161	145.3
Phenanthrene	87.3		20.3	97.1		20.2	10.6	6760		341	1550		161	125.4
Pyrene	57.4		20.3	60.2		20.2	4.8	5350		341	2230		161	82.3

Table 3-28. Sediment Method 8270-SIM Field Duplicate Results Cont 2

Analyte	Sample ID: 091213475			Sample ID: 091213486			RPD	Sample ID: 091713588			Sample ID: 091713594			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	156		80.2	154		88.4	1.3	2730		701	573		137	130.6
Acenaphthene	96.0		80.2	119		88.4	21.4	1980		701	191		137	164.8
Acenaphthylene	88.3		80.2	73.5	J	88.4	18.3	1040		701	149		137	149.9
Anthracene	239		80.2	301		88.4	23.0	2980		701	401		137	152.6
Benzo(a)anthracene	457		80.2	653		88.4	35.3	2700		701	690		137	118.6
Benzo(a)pyrene	550		80.2	809		88.4	38.1	2740		701	820		137	107.9
Benzo(b)fluoranthene	642		80.2	989		88.4	42.6	1570		701	707		137	75.8
Benzo(g,h,i)perylene	281		80.2	303		88.4	7.5	759		701	479		137	45.2
Benzo(k)fluoranthene	451		80.2	665		88.4	38.4	2220		701	803		137	93.7
Chrysene	679		80.2	928		88.4	31.0	3290		701	985		137	107.8
Dibenz(a,h)anthracene	94.5		80.2	113		88.4	17.8	350	U	701	142		137	NC
Fluoranthene	1220		80.2	1660		88.4	30.6	4860		701	1780		137	92.8
Fluorene	134		80.2	139		88.4	3.7	1410		701	272		137	135.3
Indeno(1,2,3-cd)pyrene	256		80.2	309		88.4	18.8	773		701	429		137	57.2
Naphthalene	103		80.2	136		88.4	27.6	1870		701	399		137	129.7
Phenanthrene	875		80.2	1090		88.4	21.9	6700		701	1370		137	132.1
Pyrene	1130		80.2	1490		88.4	27.5	6400		701	1600		137	120.0

Table 3-28. Sediment Method 8270-SIM Field Duplicate Results Cont 3

Analyte	Sample ID: 091813671			Sample ID: 091813674			RPD	Sample ID: 091913701			Sample ID: 091913716			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	8170		631	21200		1390	88.7	938	J	1550	489	H2	74.3	62.9
Acenaphthene	4640		631	12300		1390	90.4	4390		1550	239	H2	74.3	179.3
Acenaphthylene	1020		631	1560		1390	41.9	773	U	1550	90.4	H2	74.3	NC
Anthracene	3300		631	8770		1390	90.6	5850		1550	368	H2	74.3	176.3
Benzo(a)anthracene	2620		631	5790		1390	75.4	11600		1550	567	H2	74.3	181.4
Benzo(a)pyrene	2500		631	5360		1390	72.8	13600		1550	651	H2	74.3	181.7
Benzo(b)fluoranthene	2240		631	3880		1390	53.6	11700		1550	695	H2	74.3	177.6
Benzo(g,h,i)perylene	871		631	2830		1390	105.9	8180		1550	420	H2	74.3	180.5
Benzo(k)fluoranthene	1660		631	3960		1390	81.9	13200		1550	594	H2	74.3	182.8
Chrysene	3190		631	7090		1390	75.9	15400		1550	839	H2	74.3	179.3
Dibenz(a,h)anthracene	403	J	631	1030	J	1390	87.5	2950		1550	130	H2	74.3	183.1
Fluoranthene	5220		631	12400		1390	81.5	37400		1550	1920	H2	74.3	180.5
Fluorene	2800		631	7160		1390	87.6	4940		1550	263	H2	74.3	179.8
Indeno(1,2,3-cd)pyrene	835		631	2190		1390	89.6	7630		1550	356	H2	74.3	182.2
Naphthalene	14600		631	38400		1390	89.8	1020	J	1550	243	5q, H2	74.3	123.0
Phenanthrene	8970		631	24200		1390	91.8	38500		1550	1560	H2	74.3	184.4
Pyrene	6300		631	14800		1390	80.6	26200		1550	1550	H2	74.3	177.7

Table 3-28. Sediment Method 8270-SIM Field Duplicate Results Cont 4

<i>Analyte</i>	<i>Sample ID: 092313751</i>			<i>Sample ID: 092313760</i>			<i>RPD</i>	<i>Sample ID: 092413815</i>			<i>Sample ID: 092413827</i>			<i>RPD</i>
	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>		<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	<i>Result (µg/Kg)</i>	<i>Lab Flag</i>	<i>LOQ</i>	
2-Methylnaphthalene	62.3	J	78.3	1010		775	176.8	113	J	151	116	J	161	2.6
Acenaphthene	80.0		78.3	2240		775	186.2	128	J	151	100	J	161	24.6
Acenaphthylene	40.4	J	78.3	388	U	775	NC	109	J	151	80.3	U	161	NC
Anthracene	155		78.3	2840		775	179.3	350		151	290		161	18.8
Benzo(a)anthracene	340		78.3	6580		775	180.3	802		151	669		161	18.1
Benzo(a)pyrene	416		78.3	7810		775	179.8	1080		151	857		161	23.0
Benzo(b)fluoranthene	381		78.3	6010		775	176.2	946		151	871		161	8.3
Benzo(g,h,i)perylene	265		78.3	4740		775	178.8	741		151	561		161	27.6
Benzo(k)fluoranthene	375		78.3	7610		775	181.2	848		151	734		161	14.4
Chrysene	451		78.3	8210		775	179.2	1080		151	962		161	11.6
Dibenz(a,h)anthracene	88.6		78.3	1270		775	173.9	154		151	175		161	12.8
Fluoranthene	864		78.3	18400		775	182.1	1940		151	1740		161	10.9
Fluorene	76.6	J	78.3	2630		775	188.7	149	J	151	127	J	161	15.9
Indeno(1,2,3-cd)pyrene	228		78.3	4370		775	180.2	574		151	476		161	18.7
Naphthalene	85.4		78.3	4160		775	192.0	165		151	159	J	161	3.7
Phenanthrene	544		78.3	17700		775	188.1	1120		151	1000		161	11.3
Pyrene	715		78.3	13800		775	180.3	1750		151	1450		161	18.8

Table 3-28. Sediment Method 8270-SIM Field Duplicate Results Cont 5

Analyte	Sample ID: 092513018			Sample ID: 092513031			RPD	Sample ID: 092713114			Sample ID: 092713118			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	883		382	871		307	1.4	536		149	1260	J	1400	80.6
Acenaphthene	418		382	378		307	10.1	524		149	1400	J	1400	91.1
Acenaphthylene	336	J	382	273	J	307	20.7	383		149	700	U	1400	NC
Anthracene	1130		382	918		307	20.7	625		149	4750		1400	153.5
Benzo(a)anthracene	2040		382	1700		307	18.2	1100		149	6000		1400	138.0
Benzo(a)pyrene	2200		382	1870		307	16.2	1200		149	5050		1400	123.2
Benzo(b)fluoranthene	2510	1q	382	1660	1q	307	40.8	1110		149	4230		1400	116.9
Benzo(g,h,i)perylene	1130		382	1060		307	6.4	663		149	2160		1400	106.1
Benzo(k)fluoranthene	1840	1q	382	1960	1q	307	6.3	829		149	4830		1400	141.4
Chrysene	2930		382	2470		307	17.0	1360		149	6720		1400	132.7
Dibenz(a,h)anthracene	423		382	352		307	18.3	248		149	855	J	1400	110.1
Fluoranthene	5390		382	4610		307	15.6	2190		149	13900		1400	145.6
Fluorene	655		382	558		307	16.0	425		149	1500		1400	111.7
Indeno(1,2,3-cd)pyrene	1040		382	946		307	9.5	575		149	2080		1400	113.4
Naphthalene	1100		382	1090		307	0.9	1320		149	2410		1400	58.4
Phenanthrene	3950		382	3340		307	16.7	1880		149	11400		1400	143.4
Pyrene	4650		382	3980		307	15.5	2170		149	11600		1400	137.0

Table 3-28. Sediment Method 8270-SIM Field Duplicate Results Cont 6

<i>Analyte</i>	<i>Sample ID: 100213198</i>			<i>Sample ID: 100213212</i>			<i>RPD</i>
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
2-Methylnaphthalene	637		367	984	JH2	1520	42.8
Acenaphthene	318	J	367	759	UH2	1520	NC
Acenaphthylene	327	J	367	759	UH2	1520	NC
Anthracene	949		367	4740	H2	1520	133.3
Benzo(a)anthracene	2170		367	5560	H2	1520	87.7
Benzo(a)pyrene	2550		367	4810	H2	1520	61.4
Benzo(b)fluoranthene	2300		367	3800	H2	1520	49.2
Benzo(g,h,i)perylene	1510		367	1620	H2, L2	1520	7.0
Benzo(k)fluoranthene	2350		367	4930	H2	1520	70.9
Chrysene	3050		367	6340	H2	1520	70.1
Dibenz(a,h)anthracene	561		367	766	JH2	1520	30.9
Fluoranthene	5280		367	12400	H2	1520	80.5
Fluorene	554		367	2020	H2	1520	113.9
Indeno(1,2,3-cd)pyrene	1340		367	1640	H2	1520	20.1
Naphthalene	862		367	759	U4q, H2	1520	NC
Phenanthrene	3550		367	12700	H2	1520	112.6
Pyrene	4550		367	10200	H2	1520	76.6

3.4 SW-846 Method 8082A, Polychlorinated Biphenyls (PCBs)

3.4.1 Summary

Sediment samples were analyzed for polychlorinated biphenyls (PCBs) using SW-846 Method 8082A. Method 8082A employs gas chromatographic separation with a halogen specific electron capture detector. Identification is accomplished by comparing retention times and elution patterns to known standards and confirmed by analysis on a second gas chromatographic column of dissimilar phase.

The results of the QC review are presented below.

3.4.2 Sample Receipt

All samples were received by the laboratory in good condition, cold ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) and intact. All samples were prepared and analyzed within the prescribed holding times.

3.4.3 Method Blanks

A laboratory method blank was prepared and analyzed for each analytical batch. The sediment method blank consisted of an aliquot of sodium sulfate extracted as a sample. None of the method blanks associated with these sample analyses showed any contamination for any of the target compounds above the detection limit. Hence, no data are qualified due to method blank contamination.

In addition to the method blanks, two equipment blanks were also submitted and analyzed. None of the blanks showed any contamination for any other the PCB mixtures. No data are qualified as a consequence of the rinsate blank results.

The method blank results are summarized in Tables 3-29 and 3-30.

Table 3-29. Sediment Method 8082 Method Blank Results Summary ($\mu\text{g}/\text{Kg}$)

<i>Analyte</i>	<i>QC Batch: 142305</i>	<i>QC Batch: 142337</i>	<i>QC Batch: 142716</i>	<i>QC Batch: 142719</i>	<i>QC Batch: 143025</i>	<i>QC Batch: 143028</i>	<i>QC Batch: 143074</i>
PCB-1016 (Aroclor 1016)	25.0 U						
PCB-1221 (Aroclor 1221)	25.0 U						
PCB-1232 (Aroclor 1232)	25.0 U						
PCB-1242 (Aroclor 1242)	25.0 U						
PCB-1248 (Aroclor 1248)	25.0 U						
PCB-1254 (Aroclor 1254)	25.0 U						
PCB-1260 (Aroclor 1260)	25.0 U						

Table 3-30. Water Method 8082 Method Blank Results Summary (µg/L)

Analyte	QC Batch: 200-62536	QC Batch: 200-62680
PCB-1016 (Aroclor 1016)	0.031 U	0.031 U
PCB-1221 (Aroclor 1221)	0.041 U	0.041 U
PCB-1232 (Aroclor 1232)	0.065 U	0.065 U
PCB-1242 (Aroclor 1242)	0.037 U	0.037 U
PCB-1248 (Aroclor 1248)	0.034 U	0.034 U
PCB-1254 (Aroclor 1254)	0.044 U	0.044 U
PCB-1260 (Aroclor 1260)	0.030 U	0.030 U
PCB-1262	0.044 U	0.044 U
PCB-1268	0.020 U	0.020 U

3.4.4 Calibration

All initial calibration acceptance criteria were met for all of the analytes. Multiple calibration verifications (CCVs) were performed in the course of these analyses.

All of the CCV results associated with these analyses gave passing results (i.e., <25% D) using CLP NFG for PCBs. Hence, no data are qualified as consequence of the PCB calibration data.

3.4.5 Surrogate Compound Recoveries

Two surrogates, tetrachloro-*m*-xylene (TCMX) and decachlorobiphenyl (DCB) were spiked into each field sample to monitor method recovery. Use of these two compounds as surrogates is consistent with the SW-846 guidance.

Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. Most failed samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Sample 092613086 with no dilution had a recovery below the lower limit. Since the failed recovery is not attributable to dilution, positive results for this sample are qualified as estimated ("J"), non-detects will be qualified with a "UJ".

The surrogate recoveries for all sample analyses are presented in Table 3-31 and 3-32.

Table 3-31. Sediment Method 8082 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Dilution	Decachlorobiphenyl		Tetrachloro- m-xylene	
			Limits:	48	130	40
4085729001	092513001	1	52		61	
4085729002	092513002	3	58		66	
4085729003	092513003	2	61		68	
4085729004	092513009	30	0	S4	0	S4
4085729005	092513010	1	79		77	
4085729006	092513016	20	0	S4	0	S4
4085729007	092513017	20	0	S4	0	S4
4085729008	092513018	20	0	S4	0	S4
4085729009	092513022	3	61		59	
4085729010	092513027	20	0	S4	0	S4
4085729011	092513028	1	64		67	
4085729012	092513031	100	0	S4	0	S4
4085729013	092513032	5	65		69	
4085729014	092513033	50	0	S4	0	S4
4085729015	092513034	100	0	S4	0	S4
4085729016	092513040	10	79		65	
4085729017	092513044	1	64		63	
4085729018	092513045	1	63		64	
4085729019	092613048	20	0	S4	0	S4
4085729020	092613049	30	0	S4	0	S4
4085729021	092613050	50	0	S4	0	S4
4085729022	092613065	1	51		62	
4085729023	092613067	1	51		60	
4085729024	092613071	2	56		68	
4085729025	092613072	3	61		68	
4085729026	092613073	2	55		66	
4085729027	092613086	1	46	S0	57	
4085729028	092613088	1	63		66	
4085983001	092713095	5	78		74	
4085983002	092713096	5	84		76	
4085983003	092713097	50	0	S4	0	S4
4085983004	092713101	10	88		67	
4085983005	092713107	1	81		74	
4085983006	092713110	20	0	S4	0	S4
4085983007	092713114	10	97		67	
4085983008	092713115	5	93		69	
4085983009	092713116	1	81		73	
4085983010	092713118	10	92		63	
4085983011	092713119	100	0	S4	0	S4
4085983012	092713121	10	84		67	
4085983013	092713127	1	76		69	

<i>Lab Sample Number</i>	<i>Field ID</i>	<i>Dilution</i>	<i>Decachlorobiphenyl</i>		<i>Tetrachloro-m-xylene</i>	
4085983014	092713128	1	83		74	
4085983015	100113140	10	75		69	
4085983016	100113141	2	70		63	
4085983017	100113142	2	67		61	
4085983018	100113147	1	94		67	
4085983019	100113155	1	72		65	
4085983020	100113156	1	76		70	
4085983021	100113158	1	82		79	
4086154001	100213166	2	76		76	
4086154002	100213167	4	67		67	
4086154003	100213168	4	73		71	
4086154004	100213172	10	91		68	
4086154005	100213178	1	78		73	
4086154006	100213181	1	77		76	
4086154007	100213182	4	78		75	
4086154008	100213183	1	75		78	
4086154009	100213184	2	75		72	
4086154010	100213191	1	70		78	
4086154011	100213193	1	78		75	
4086154012	100213194	1	76		71	
4086154013	100213196	4	72		66	
4086154014	100213197	4	73		68	
4086154015	100213198	50	0	S4	0	S4
4086154016	100213209	1	68		75	
4086154017	100213210	1	76		75	
4086154018	100213212	50	0	S4	0	S4
4086154019	100313213	3	73		71	
4086154020	100313214	4	72		72	
4086154021	100313215	4	75		72	
4086154022	100313231	50	0	S4	0	S4
4086154023	100313236	1	84		82	
4086154024	100313238	50	0	S4	0	S4
4086154025	100313239	100	0	S4	0	S4
4086154026	100313240	50	0	S4	0	S4
4086154027	100313249	1	72		82	
4086154028	100313251	1	78		79	

Table 3-32. Water Method 8082 Surrogate Recoveries

Lab Sample Number	Field ID	Dilution	Decachlorobiphenyl		Tetrachloro- <i>m</i> -xylene	
		Limits:	30	150	55	120
200-18754-1	092713094	1	32		55	
			37		60	
200-18754-2	093013131	1	51		82	
			53		87	
200-18754-4	100113139	1	50		80	
			53		85	
200-18810-1	100213164	1	72		70	
			81		87	
200-18810-3	100313237	1	41		71	
			48		91	

3.4.6 Matrix Spike / Matrix Spike Duplicate

Matrix spike/matrix spiked duplicate (MS/MSD) analyses were performed on multiple samples. Some of the PCB-1260 for the MS/MSD analyses samples recovered outside the limits used by the laboratory. The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data alone. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The MS/MSD recoveries for all sample analyses are presented in Table 3-33.

Table 3-33. Sediment Method 8082 MS/MSD Results Summary

Sample ID	Analyte	Spike (µg/Kg)	MS Result (µg/Kg)	Recovery (%)	MSD Result (µg/Kg)	Recovery (%)	RPD	Lab Sample Result (µg/Kg)	Max RPD
092513017	PCB-1260 (Aroclor 1260)	1080	1750 J	162	1740	160		1080 UM6	31
092713101	PCB-1260 (Aroclor 1260)	959	1360	83	1360	83	0	567 J	31
092713107	PCB-1260 (Aroclor 1260)	589	456	77	446	76	2	29.5 U	31
100213178	PCB-1260 (Aroclor 1260)	590	508	86	499	85	2	29.5 U	31
100213197	PCB-1260 (Aroclor 1260)	1070	1240	92	1100	79	11	258 J	31
100313239	PCB-1260 (Aroclor 1260)	1110	5560 U	0	0	0		5560 UM6	31

3.4.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed for each analytical batch. None of the recoveries exceeded the laboratory's control limits for any of the PCB mixtures; hence there is no need for any further qualification of the data.

The laboratory control sample results are presented in Table 3-34 and 3-35.

Table 3-34. Sediment Method 8082 LCS Results Summary

Analyte	Recovery Limits (%)		QC Batch: 142305			QC Batch: 142337			QC Batch: 142716		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
PCB-1260 (Aroclor 1260)	70	130	500	438	88	500	436	87	500	431	86

Table 3-34. Sediment Method 8082 LCS Results Summary Cont 1

Analyte	Recovery Limits (%)		QC Batch: 142719			QC Batch: 143025			QC Batch: 143028		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
PCB-1260 (Aroclor 1260)	70	130	500	426	85	500	467	93	500	454	91

Table 3-34. Sediment Method 8082 LCS Results Summary Cont 2

Analyte	Recovery Limits (%)		QC Batch: 143074		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
PCB-1260 (Aroclor 1260)	70	130	500	443	89

Table 3-35. Water Method 8082 LCS Summary

Analyte	Recovery Limits (%)		QC Batch: 200-62536			QC Batch: 200-62680		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
PCB-1016 (Aroclor 1016)	55	120	5.00	4.50	90	5.00	4.03	81
PCB-1260 (Aroclor 1260)	60	125	5.00	4.62	92	5.00	3.85	77

3.4.8 Field Duplicates

Field duplicates generally exhibited good agreement for most of analytes with RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for volatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values where the results are >2x the limit of quantitation. A few samples exceeded 30% at more than twice the limit of quantitation therefore, these analytes for these samples and their duplicate only will be qualified as estimated ("J").

The results of the duplicate analyses are given in Table 3-36.

Table 3-36. Sediment Method 8082 Field Duplicate Results

Analyte	Sample ID: 092513018			Sample ID: 092513031			RPD	Sample ID: 092713114			Sample ID: 092713118			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ		Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
PCB, Total	14400		2290	39100		11500	92.3	7770		1120	12000		1050	42.8
PCB-1016 (Aroclor 1016)	1150	U	2290	5760	U	11500	0.0	558	U	1120	525	U	1050	0.0
PCB-1221 (Aroclor 1221)	1150	U	2290	5760	U	11500	0.0	558	U	1120	525	U	1050	0.0
PCB-1232 (Aroclor 1232)	1150	U	2290	5760	U	11500	0.0	558	U	1120	525	U	1050	0.0
PCB-1242 (Aroclor 1242)	1150	U	2290	5760	U	11500	0.0	558	U	1120	525	U	1050	0.0
PCB-1248 (Aroclor 1248)	14400		2290	39100		11500	92.3	3650		1120	7000		1050	62.9
PCB-1254 (Aroclor 1254)	1150	U	2290	5760	U	11500	0.0	4110		1120	4970		1050	18.9
PCB-1260 (Aroclor 1260)	1150	U	2290	5760	U	11500	0.0	558	U	1120	525	U	1050	0.0

Table 3-36. Sediment Method 8082 Field Duplicate Results Cont

Analyte	Sample ID: 100213198			Sample ID: 100213212			RPD
	Result (µg/Kg)	Lab Flag	LOQ	Result (µg/Kg)	Lab Flag	LOQ	
PCB, Total	51200		5510	44800		5700	13.3
PCB-1016 (Aroclor 1016)	2750	U	5510	2850	U	5700	0.0
PCB-1221 (Aroclor 1221)	2750	U	5510	2850	U	5700	0.0
PCB-1232 (Aroclor 1232)	2750	U	5510	2850	U	5700	0.0
PCB-1242 (Aroclor 1242)	2750	U	5510	2850	U	5700	0.0
PCB-1248 (Aroclor 1248)	37200		5510	44800		5700	18.5
PCB-1254 (Aroclor 1254)	13900		5510	2850	U	5700	NC
PCB-1260 (Aroclor 1260)	2750	U	5510	2850	U	5700	0.0

3.5 Alkylated PAHs

3.5.1 Summary

Analysis for alkylated PAHs was performed using a method developed by the analytical laboratory. The method employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM). Results are reported as compound classes (e.g., "C2-Fluorenes") rather than specific alkylated moieties. The lab is not accredited under NELAP for the following parameters; 2-Methylnaphthalene, Benzo(a,b)fluoranthene, Benzo(e)pyrene, C1-Chrysenes, C1-Fluoranthenes/Pyrenes, C1-Fluorenes, C1-Naphthalenes, C1-Phenanthrenes/Anthracenes, C2-Chrysenes, C2-Fluorenes, C2-Naphthalenes, C2-Phenanthrenes/Anthracenes, C3-Chrysenes, C3-Fluorenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Chrysenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes, Naphthalene and, Perylene.

3.5.2 Method Blanks

The samples were prepared in a multiple preparation batches. None of the target compounds for this method gave a positive result. Therefore, no data are qualified due to method blank contamination.

The results for the method blanks are summarized in Table 3-37.

**Table 3-37. Sediment Alkylated PAH by SIM Method Blank Results Summary
(µg/Kg)**

Analyte	QC Batch: 267086	QC Batch: 268019	QC Batch: 268617	QC Batch: 270004	QC Batch: 271256	QC Batch: 272210	QC Batch: 272613
2-Methylnaphthalene	5.0 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
Acenaphthene	5.0 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
Acenaphthylene	5.0 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Anthracene	5.0 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Benzo(a)anthracene	5.0 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
Benzo(a)pyrene	5.0 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U
Benzo(a,b)fluoranthene	5.0 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U
Benzo(e)pyrene	5.0 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U
Benzo(g,h,i)perylene	5.0 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
Benzo(k)fluoranthene	5.0 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U
C1-Chrysenes	5.0 U						
C1-Fluoranthenes/Pyrenes	5.0 U						
C1-Fluorenes	5.0 U						
C1-Naphthalenes	5.0 U						
C1-Phenanthrenes/Anthracenes	5.0 U						
C2-Chrysenes	5.0 U						
C2-Fluorenes	5.0 U						
C2-Naphthalenes	5.0 U						
C2-Phenanthrenes/Anthracenes	5.0 U						
C3-Chrysenes	5.0 U						
C3-Fluorenes	5.0 U						
C3-Naphthalenes	5.0 U						
C3-Phenanthrenes/Anthracenes	5.0 U						
C4-Chrysenes	5.0 U						
C4-Naphthalenes	5.0 U						
C4-Phenanthrenes/Anthracenes	5.0 U						
Chrysene	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibenz(a,h)anthracene	5.0 U	0.52 U	0.52 U	0.52 U	0.52 U	0.52 U	0.52 U
Fluoranthene	5.0 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U
Fluorene	5.0 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
Indeno(1,2,3-cd)pyrene	5.0 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U
Naphthalene	5.0 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U
Perylene	5.0 U	2.0 U					
Phenanthrene	5.0 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
Pyrene	5.0 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U

3.5.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for the alkylated PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes.

3.5.4 Surrogate Compound Recoveries

Three surrogates, 2-fluorobiphenyl, nitrobenzene-*d*₅, and terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., alkylated PAHs), the surrogates reported should be adequate to monitor recovery in the analyses. Multiple samples in this data set gave surrogate recoveries outside of the laboratory's recovery limits. A few samples had surrogates with 0% recovery due to sample dilution. Under these circumstances qualification of data is not warranted. Using the guidance from the October 1999 National Functional Guidelines (since the current NFG do not effectively address surrogate compounds), only sample results where at least two surrogate compounds from each fraction (i.e., base/neutral fraction or acid fraction) fail to recover within limits are cause for qualification. Note that the report narratives do not address failed surrogate recoveries for this test. Hence no data will be qualified based on surrogate recoveries.

The surrogate recoveries for all samples are presented in Table 3-38.

Table 3-38. Sediment Alkylated PAH by SIM Surrogate Results Summary

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Nitrobenzene-d ₅		Terphenyl-d ₁₄		
			Limits:	59	125	30	125	63	125
4083785001	082613002	5		94		88		114	
4083785004	082613015	50	0	S4	0	S4	642	S4	
4083785016	082713050	20	0	S4	0	S4	0	S4	
4083785017	082713051	20	0	S4	0	S4	0	S4	
4083785018	082713052	5		89		88		104	
4083785025	082713081	20	0	S4	0	S4	0	S4	
4083977001	082813084	5		78		81		95	
4083977008	082813105	5	130	S5	203	S5	159	S5	
4083977010	082813107	5		81		95		96	
4083977013	082913127	5		95		96		118	
4084169001	083013150	1		110		124		155	S4
4084169005	083013167	5		120		136	S4	150	S4
4084169009	090313182	5		109		98		129	S4
4084169012	090313201	20	0	S4	0	S4	0	S4	
4084310001	090513234	5		123		113		152	S4
4084310006	090513243	50	0	S4	0	S4	143	S4	
4084310009	090513252	5	0	S4	0	S4	0	S4	
4084310014	090513269	5		96		80		118	
4084310017	090513274	5		117		117		148	S4
4084566001	090613283	10		102		78		115	
4084566007	090613297	10		94		80		108	
4084566011	090613311	10		104		78		116	
4084566016	090913323	10		108		55		124	
4084566022	090913335	10		104		86		119	
4084566027	090913346	10		90		72		98	
4084566030	090913357	10		96		83		107	
4084566033	090913361	5		105		83		115	
4084566036	091013373	10		102		75		117	
4084566043	091013399	5		100		68		110	
4084784001	091113424	10		83		71		90	
4084784004	091113430	10		99		107		121	
4084784007	091113437	10		98		79		108	
4084784010	091113450	10		101		85		114	
4084784014	091113461	10		100		85		114	
4084784020	091213473	5		100		91		113	
4084784024	091213487	10		85		77		93	
4084784027	091213495	10		105		89		116	

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Nitrobenzene-d₅		Terphenyl-d₁₄	
4084784030	091213498	10	97		78		113	
4084784033	091213509	10	97		84		111	
4085044003	091613553	5	108		101		128	S4
4085044006	091613564	10	97		104		110	
4085044009	091713569	10	83		70		95	
4085044025	091713614	10	100		77		112	
4085044026	091713615	10	103		86		116	
4085230007	091813654	10	84		67		93	
4085230008	091813655	10	86		73		96	
4085230015	091813675	10	95		79		108	
4085230020	091813688	10	95		81		108	
4085230026	091913699	10	115		99		129	S4
4085230029	091913712	10	100		90		113	
4085230033	091913717	10	85		74		98	
4085483001	092313734	1	102		104		115	
4085483008	092313749	1	105		105		120	
4085483014	092313761	1	102		100		119	
4085483020	092413776	1	104		100		124	
4085483025	092413799	1	100		95		117	
4085483028	092413809	1	95		88		109	
4085483031	092413813	1	104		101		121	
4085729001	092513001	1	101		90		123	
4085729006	092513016	1	102		121		140	S5
4085729009	092513022	1	92		97		121	
4085729013	092513032	5	111		95		139	S5
4085729019	092613048	1	100		92		125	
4085729024	092613071	5	104		92		119	
4085983001	092713095	5	0	S4	0	S4	0	S4
4085983008	092713115	5	0	S4	0	S4	0	S4
4085983013	092713127	5	0	S4	0	S4	128	S4
4085983015	100113140	5	0	S4	0	S4	0	S4
4086154001	100213166	1	99		97		128	S0
4086154004	100213172	10	0	S4	0	S4	0	S4
4086154007	100213182	1	99		90		126	S0
4086154010	100213191	10	0	S4	0	S4	0	S4
4086154013	100213196	5	100		88		122	
4086154019	100313213	5	106		90		126	S0
4086154024	100313238	5	0	S4	0	S4	0	S4

3.5.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on multiple samples.

Most of the analytes gave failing recoveries for the matrix spiked sample and/or the matrix spiked duplicate sample. Consequently, many of the RPD values exceeded the laboratory limits for the reported analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data. Most failures are attributed to samples dilution. No results will be qualified based on MS/MSD recovery.

The matrix spike/matrix spike duplicate results are summarized in Table 3-39

Table 3-39. Sediment Alkylated PAH by SIM MS/MSD Results Summary 082713051

Analyte	MS Sample ID: 082713051			MSD Sample ID: 082713051			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	63.8	5690	150	63.8	5880	444	3	5600 M6, N2	30
Acenaphthene	63.8	4390	107	63.8	4610	457	5	4320 M6	30
Acenaphthylene	63.8	2900	-439	63.8	3030	-237	4	3180 M6	30
Anthracene	63.8	5880	-446	63.8	6200	56	5	6170 M6	30
Benzo(a)anthracene	63.8	9240	-1400	63.8	9980	-258	8	10100 M6	30
Benzo(a)pyrene	63.8	9140	-1460	63.8	9580	-789	5	10100 M6	30
Benzo(a,b)fluoranthene	76.7	14000	-2770	76.7	15200	-1100	9	16100 M6, N2	30
Benzo(e)pyrene	63.8	7250	-1070	63.8	7430	-800	2	7930 M6, N2	30
Benzo(g,h,i)perylene	63.8	5380	-914	63.8	5500	-738	2	5960 M6	30
Benzo(k)fluoranthene	63.8	4000	-896	63.8	4260	-508	6	4580 M6	30
Chrysene	63.8	12600	-2600	63.8	13400	-1450	6	14300 M6	30
Dibenz(a,h)anthracene	63.8	1610 J	-170	63.8	1670	-68		1710 JM6	30
Fluoranthene	63.8	23400	-4150	63.8	24300	-2810	4	26000 M6	30
Fluorene	63.8	3690	-174	63.8	3870	110	5	3800 M6	30
Indeno(1,2,3-cd)pyrene	63.8	4640	-612	63.8	4710	-501	2	5030 M6	30
Naphthalene	63.8	1550 J	690	63.8	1510	641		1110 JM6, N2	30
Perylene	63.8	2090	-8	63.8	2140	59	2	2100 M6, N2	30
Phenanthrene	63.8	18800	-2190	63.8	19700	-719	5	20200 M6	30
Pyrene	63.8	24300	-4490	63.8	25700	-2300	6	27200 M6	30

Table 3-39. Sediment Alkylated PAH by SIM MS/MSD Results Summary 083013150

<i>Analyte</i>	<i>MS Sample ID: 083013150</i>			<i>MSD Sample ID: 083013150</i>			<i>RPD</i>	<i>Lab Sample Result (µg/Kg)</i>	<i>Max RPD</i>
	<i>Spike (µg/Kg)</i>	<i>MS Result (µg/Kg)</i>	<i>Rec (%)</i>	<i>Spike (µg/Kg)</i>	<i>MSD Result (µg/Kg)</i>	<i>Rec (%)</i>			
2-Methylnaphthalene	83.6	492J J	300	83.6	501	312		242 M6, N2	30
Acenaphthene	83.6	718J J	357	83.6	748	395		419 M6	30
Acenaphthylene	83.6	979J J	420	83.6	1010	454		627 M6	30
Anthracene	83.6	1840	716	83.6	1910	799	3	1240 M6	30
Benzo(a)anthracene	83.6	5440	2540	83.6	5780	2980	6	3310 M6	30
Benzo(a)pyrene	83.6	6440	3270	83.6	6620	3510	3	3710 M6	30
Benzo(a,b)fluoranthene	100	10600	2270	100	10900	2590	3	8310 M6, N2	30
Benzo(e)pyrene	83.6	5190	2660	83.6	5440	2980	5	2970 M6, N2	30
Benzo(g,h,i)perylene	83.6	4670	2800	83.6	4750	2910	2	2330 M6	30
Benzo(k)fluoranthene	83.6	3380	2110	83.6	3590	2380	6	1610 M6	30
Chrysene	83.6	7730	1940	83.6	7910	2170	2	6110 M6	30
Dibenz(a,h)anthracene	83.6	1240J J	679	83.6	1260	711		672 M6	30
Fluoranthene	83.6	15000	4340	83.6	15100	4530	0.9	11300 M6	30
Fluorene	83.6	884J J	408	83.6	909	440		543 M6	30
Indeno(1,2,3-cd)pyrene	83.6	3860	2180	83.6	3950	2300	2	2040 M6	30
Naphthalene	83.6	375J J	265	83.6	374	266		153 M6, N2	30
Perylene	83.6	1670	888	83.6	1700	925	2	927 M6, N2	30
Phenanthrene	83.6	7120	1990	83.6	7010	1860	2	5460 M6	30
Pyrene	83.6	12400	3560	83.6	12200	3430	1	9400 M6	30

Table 3-39. Sediment Alkylated PAH by SIM MS/MSD Results Summary 090913335

Analyte	MS Sample ID: 090913335			MSD Sample ID: 090913335			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	71.1	11200	1610	71.1	36500	37300	106	10000 M6, N2, R1	30
Acenaphthene	71.1	16400	14500	71.1	22300	22900	30	6130 M6	30
Acenaphthylene	71.1	2000	670	71.1	3910	3360	64	1530 M6, R1	30
Anthracene	71.1	17900	18000	71.1	17600	17600	2	5080 M6	30
Benzo(a)anthracene	71.1	33400	39100	71.1	13500	11100	85	5580 M6, R1	30
Benzo(a)pyrene	71.1	37900	45300	71.1	13300	10800	96	5630 M6, R1	30
Benzo(a,b)fluoranthene	85.5	54800	55500	85.5	15700	9770	111	7410 M6, N2, R1	30
Benzo(e)pyrene	71.1	26900	32600	71.1	8440	6640	105	3730 M6, N2, R1	30
Benzo(g,h,i)perylene	71.1	25200	31000	71.1	6950	5340	114	3160 M6, R1	30
Benzo(k)fluoranthene	71.1	18400	22800	71.1	5170	4170	112	2210 M6, R1	30
Chrysene	71.1	40900	48400	71.1	15100	12100	92	6480 M6, R1	30
Dibenz(a,h)anthracene	71.1	6060	7350	71.1	1960	1590	102	836 JM6, R1	30
Fluoranthene	71.1	97400	119000	71.1	31400	26700	102	12500 M6, R1	30
Fluorene	71.1	11900	12100	71.1	12100	12400	2	3270 M6	30
Indeno(1,2,3-cd)pyrene	71.1	21900	27000	71.1	5870	4500	115	2690 M6, R1	30
Naphthalene	71.1	24500	14700	71.1	49200	49600	67	14000 M6, N2, R1	30
Perylene	71.1	11800	14800	71.1	2940	2360	120	1270 M6, N2, R1	30
Phenanthrene	71.1	85000	100000	71.1	48000	48100	56	13900 M6, R1	30
Pyrene	71.1	78600	92500	71.1	34100	30000	79	12800 M6, R1	30

Table 3-39. Sediment Alkylated PAH by SIM MS/MSD Results Summary 091613553

Analyte	MS Sample ID: 091613553			MSD Sample ID: 091613553			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	91.2	146	135	91.2	134	122		22.4 JN2	30
Acenaphthene	91.2	198	152	91.2	176	127	12	59.6 JM1	30
Acenaphthylene	91.2	248	149	91.2	223	121	11	112 J	30
Anthracene	91.2	634	477	91.2	374	190	52	199 M1, R1	30
Benzo(a)anthracene	91.2	1330	724	91.2	950	306	33	668 M1, R1	30
Benzo(a)pyrene	91.2	1450	712	91.2	1190	425	20	796 M1	30
Benzo(a,b)fluoranthene	109	2360	894	109	2110	656	11	1380 M1, N2	30
Benzo(e)pyrene	91.2	1150	553	91.2	1020	401	12	648 M1, N2	30
Benzo(g,h,i)perylene	91.2	696	275	91.2	647	220	7	445 M1	30
Benzo(k)fluoranthene	91.2	847	500	91.2	644	275	27	391 M1	30
Chrysene	91.2	1700	887	91.2	1320	475	25	886 M1	30
Dibenz(a,h)anthracene	91.2	264	149	91.2	224	105	16	128 J	30
Fluoranthene	91.2	3360	1890	91.2	2420	861	32	1630 M1, R1	30
Fluorene	91.2	302	250	91.2	198	134	42	74.4 JM1, R1	30
Indeno(1,2,3-cd)pyrene	91.2	650	281	91.2	589	212	10	393 M1	30
Naphthalene	91.2	110J J	101	91.2	100	89		17.9 JN2	30
Perylene	91.2	413	232	91.2	351	163	16	201 M1, N2	30
Phenanthrene	91.2	2120	1570	91.2	1100	450	63	690 M1, R1	30
Pyrene	91.2	2690	1450	91.2	2040	739	27	1360 M1	30

Table 3-39. Sediment Alkylated PAH by SIM MS/MSD Results Summary 092413813

Analyte	MS Sample ID: 092413813			MSD Sample ID: 092413813			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	101	161	62	101	170	71	5	97.8 JN2	30
Acenaphthene	101	271	36	101	264	30	3	234	30
Acenaphthylene	101	523	-53	101	549	-27	5	576 M1	30
Anthracene	101	788	-166	101	776	-179	2	957 M1	30
Benzo(a)anthracene	101	2380	-654	101	2300	-739	3	3050 M1	30
Benzo(a)pyrene	101	2920	-670	101	2790	-810	5	3600 M1	30
Benzo(a,b)fluoranthene	122	5070	-1230	122	4960	-1320	2	6570 M1, N2	30
Benzo(e)pyrene	101	2320	-544	101	2230	-637	4	2880 M1, N2	30
Benzo(g,h,i)perylene	101	1260	-291	101	1160	-391	8	1550 M1	30
Benzo(k)fluoranthene	101	1540	-417	101	1640	-316	7	1960 M1	30
Chrysene	101	3150	-984	101	3040	-1100	4	4150 M1	30
Dibenz(a,h)anthracene	101	408	-69	101	391	-86	4	478 M1	30
Fluoranthene	101	5580	-2810	101	5350	-3060	4	8430 M1	30
Fluorene	101	315	30	101	322	37	2	285	30
Indeno(1,2,3-cd)pyrene	101	1200	-303	101	1120	-384	7	1510 M1	30
Naphthalene	101	158	56	101	157	55	0.8	102 JN2	30
Perylene	101	781	-100	101	734	-147	6	882 M1, N2	30
Phenanthrene	101	2400	-665	101	2260	-811	6	3080 M1	30
Pyrene	101	4920	-2340	101	4730	-2550	4	7300 M1	30

Table 3-39. Sediment Alkylated PAH by SIM MS/MSD Results Summary 092713115

Analyte	MS Sample ID: 092713115			MSD Sample ID: 092713115			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	61	3180	353	61	1970	-1640	47	2960 M1, N2, R1	30
Acenaphthene	61	4160	303	61	2640	-2200	45	3980 M1, R1	30
Acenaphthylene	61	848	398	61	599	-10	34	605 M1, R1	30
Anthracene	61	2740	432	61	1740	-1220	45	2480 M1, R1	30
Benzo(a)anthracene	61	2420	388	61	1540	-1050	44	2180 M1, R1	30
Benzo(a)pyrene	61	2490	608	61	1540	-944	47	2120 M1, R1	30
Benzo(a,b)fluoranthene	73.3	2590	314	73.3	1750	-832	39	2360 M1, N2, R1	30
Benzo(e)pyrene	61	1520	403	61	998	-447	41	1270 M1, N2, R1	30
Benzo(g,h,i)perylene	61	1230	427	61	789	-302	44	972 M1, R1	30
Benzo(k)fluoranthene	61	695	160	61	563	-56	21	597 M1	30
Chrysene	61	2540	447	61	1660	-997	42	2260 M1, R1	30
Dibenz(a,h)anthracene	61	328J J	116	61	234	-39		258 JM1	30
Fluoranthene	61	5030	349	61	3360	-2390	40	4810 M1, R1	30
Fluorene	61	1800	140	61	1180	-889	42	1720 M1, R1	30
Indeno(1,2,3-cd)pyrene	61	960	293	61	644	-226	39	781 M1, R1	30
Naphthalene	61	4000	372	61	2440	-2190	48	3770 M1, N2, R1	30
Perylene	61	473	163	61	330	-72		374 JM1, N2	30
Phenanthrene	61	7860	477	61	5070	-4130	43	7570 M1, R1	30
Pyrene	61	6670	716	61	4270	-3240	44	6230 M1, R1	30

Table 3-39. Sediment Alkylated PAH by SIM MS/MSD Results Summary 100313238

Analyte	MS Sample ID: 100313238			MSD Sample ID: 100313238			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	68.2	339J J	115	68.2	202	-87		261 JM1, N2	30
Acenaphthene	68.2	303J J	3	68.2	239	-91		301 JM1	30
Acenaphthylene	68.2	406J J	91	68.2	307	-54		344 JM1	30
Anthracene	68.2	679	-96	68.2	488	-378		745 M1	30
Benzo(a)anthracene	68.2	1930	-231	68.2	1370	-1050	34	2090 M1, R1	30
Benzo(a)pyrene	68.2	2060	-19	68.2	1430	-940	36	2070 M1, R1	30
Benzo(a,b)fluoranthene	81.9	3350	57	81.9	2270	-1260	38	3300 M1, N2, R1	30
Benzo(e)pyrene	68.2	1640	62	68.2	1110	-723	39	1600 M1, N2, R1	30
Benzo(g,h,i)perylene	68.2	1250	129	68.2	842	-472	39	1160 M1, R1	30
Benzo(k)fluoranthene	68.2	1020	-40	68.2	736	-461	33	1050 M1, R1	30
Chrysene	68.2	2710	-46	68.2	1820	-1350	39	2740 M1, R1	30
Dibenz(a,h)anthracene	68.2	382J J	63	68.2	278	-89		339 JM1	30
Fluoranthene	68.2	5020	-699	68.2	3440	-3020	37	5500 M1, R1	30
Fluorene	68.2	409J J	-22	68.2	298	-185		424 JM1	30
Indeno(1,2,3-cd)pyrene	68.2	1090	92	68.2	766	-389	35	1030 M1, R1	30
Naphthalene	68.2	161J J	25	68.2	127	-24		143 JM1, N2	30
Perylene	68.2	534	30	68.2	398	-170		514 M1, N2	30
Phenanthrene	68.2	2670	-513	68.2	1930	-1590	32	3020 M1, R1	30
Pyrene	68.2	4220	-688	68.2	2860	-2680	38	4690 M1, R1	30

3.5.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples.

All of the analytes for all of the laboratory control samples recovered within the limits used by the laboratory. No data are qualified based upon laboratory control sample results. The laboratory control sample results are given in Table 3-40.

Table 3-40. Sediment Alkylated PAH by SIM LCS Results Summary

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 267086</i>			<i>QC Batch: 268019</i>			<i>QC Batch: 268617</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	41	125	33.3	16.0	48	33.3	27.1	81	33.3	28.9	87
Acenaphthene	41	125	33.3	15.1	45	33.3	23.5	71	33.3	25.1	75
Acenaphthylene	43	125	33.3	14.9	45	33.3	24.7	74	33.3	25.9	78
Anthracene	39	142	33.3	23.8	71	33.3	26.6	80	33.3	27.4	82
Benzo(a)anthracene	48	131	33.3	26.1	78	33.3	27.6	83	33.3	28.4	85
Benzo(a)pyrene	52	125	33.3	26.4	79	33.3	28.5	86	33.3	30.1	90
Benzo(a,b)fluoranthene	41	150	40	32.1	80	40	33.7	84	40	35.1	88
Benzo(e)pyrene	47	138	33.3	25.9	78	33.3	27.3	82	33.3	28.2	84
Benzo(g,h,i)perylene	46	132	33.3	26.0	78	33.3	26.3	79	33.3	29.8	89
Benzo(k)fluoranthene	49	139	33.3	26.2	78	33.3	27.6	83	33.3	28.5	85
Chrysene	70	130	33.3	26.3	79	33.3	27.5	83	33.3	28.1	84
Dibenz(a,h)anthracene	46	143	33.3	27.3	82	33.3	28.0	84	33.3	31.7	95
Fluoranthene	47	146	33.3	27.6	83	33.3	29.3	88	33.3	30.3	91
Fluorene	38	135	33.3	18.8	56	33.3	25.3	76	33.3	27.0	81
Indeno(1,2,3-cd)pyrene	48	136	33.3	26.8	81	33.3	27.6	83	33.3	31.1	93
Naphthalene	38	125	33.3	14.3	43	33.3	23.2	69	33.3	24.6	74
Perylene	33	125	33.3	28.6	86	33.3	29.3	88	33.3	30.5	92
Phenanthrene	40	136	33.3	23.8	71	33.3	25.5	76	33.3	26.2	79
Pyrene	50	137	33.3	28.0	84	33.3	29.1	87	33.3	29.2	88

Table 3-40. Sediment Alkylated PAH by SIM LCS Results Summary Cont 1

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 270004</i>			<i>QC Batch: 271256</i>			<i>QC Batch: 272210</i>		
	<i>Lower</i>	<i>Upper</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>	<i>Spike (µg/Kg)</i>	<i>Result (µg/Kg)</i>	<i>Recovery (%)</i>
2-Methylnaphthalene	41	125	33.3	27.1	81	33.3	26.0	78	33.3	25.2	76
Acenaphthene	41	125	33.3	23.4	70	33.3	22.4	67	33.3	22.6	68
Acenaphthylene	43	125	33.3	23.8	72	33.3	23.0	69	33.3	23.4	70
Anthracene	39	142	33.3	27.0	81	33.3	25.0	75	33.3	25.5	76
Benzo(a)anthracene	48	131	33.3	28.4	85	33.3	26.5	79	33.3	27.0	81
Benzo(a)pyrene	52	125	33.3	29.8	89	33.3	27.2	82	33.3	27.5	83
Benzo(a,b)fluoranthene	41	150	40	33.6	84	40	31.5	79	40	32.6	81
Benzo(e)pyrene	47	138	33.3	28.2	85	33.3	25.4	76	33.3	26.2	79
Benzo(g,h,i)perylene	46	132	33.3	29.1	87	33.3	26.0	78	33.3	25.4	76
Benzo(k)fluoranthene	49	139	33.3	28.1	84	33.3	26.1	78	33.3	26.4	79
Chrysene	70	130	33.3	28.1	84	33.3	26.4	79	33.3	27.1	81
Dibenz(a,h)anthracene	46	143	33.3	29.8	89	33.3	27.1	81	33.3	26.2	79
Fluoranthene	47	146	33.3	30.2	91	33.3	27.6	83	33.3	28.3	85
Fluorene	38	135	33.3	25.2	76	33.3	23.7	71	33.3	24.4	73
Indeno(1,2,3-cd)pyrene	48	136	33.3	29.7	89	33.3	26.8	81	33.3	26.0	78
Naphthalene	38	125	33.3	23.0	69	33.3	21.9	66	33.3	21.2	64
Perylene	33	125	33.3	30.9	93	33.3	27.9	84	33.3	28.6	86
Phenanthrene	40	136	33.3	25.7	77	33.3	23.8	71	33.3	24.4	73
Pyrene	50	137	33.3	29.9	90	33.3	27.6	83	33.3	28.7	86

Table 3-40. Sediment Alkylated PAH by SIM LCS Results Summary Cont 2

<i>Analyte</i>	<i>Recovery Limits (%)</i>		<i>QC Batch: 272613</i>		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Recovery (%)
2-Methylnaphthalene	41	125	33.3	23.2	70
Acenaphthene	41	125	33.3	20.5	61
Acenaphthylene	43	125	33.3	20.8	63
Anthracene	39	142	33.3	26.5	79
Benzo(a)anthracene	48	131	33.3	28.2	85
Benzo(a)pyrene	52	125	33.3	28.5	85
Benzo(a,b)fluoranthene	41	150	40	34.1	85
Benzo(e)pyrene	47	138	33.3	27.4	82
Benzo(g,h,i)perylene	46	132	33.3	26.4	79
Benzo(k)fluoranthene	49	139	33.3	27.8	83
Chrysene	70	130	33.3	28.5	85
Dibenz(a,h)anthracene	46	143	33.3	27.3	82
Fluoranthene	47	146	33.3	29.7	89
Fluorene	38	135	33.3	23.8	71
Indeno(1,2,3-cd)pyrene	48	136	33.3	27.1	81
Naphthalene	38	125	33.3	20.2	61
Perylene	33	125	33.3	29.3	88
Phenanthrene	40	136	33.3	25.4	76
Pyrene	50	137	33.3	30.2	91

3.5.7 Field Duplicates

No project specific field duplicates were analyzed with this data.

Data Validation Report

2069 NORTH BRANCH

Sediment Sample Analyses Performed by

Pace Analytical, Green Bay

Prepared for



Prepared by

SHEPHERD TECHNICAL SERVICES

May 13, 2014

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1.0 INTRODUCTION

All data validation was performed by Shepherd Technical Services following US EPA National Functional Guidelines (NFG), where applicable, using electronic deliverables.

Pace Analytical Services, Inc., Green Bay, WI performed the sample analyses on the sediment samples. The Pace Green Bay laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200050). The Pace laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Florida Department of Health Environmental Laboratory Certification Program (ID #E87948).

The laboratories provided all analytical data, including all internal laboratory QC results in an electronic deliverable format.

A total of 64 total sediment samples were collected August 26 to December 4, 2013 at the North Branch site. Samples were organized into 3 sample delivery groups (SDGs, or laboratory lot numbers) performed by Pace. Samples were analyzed for the indicated parameters using the methods listed in Table 1-1.

All soil samples were analyzed using ASTM D2974-87 for Percent Moisture. The moisture data were used by the laboratory to correct the analytical results for moisture content in the soil samples.

Table 1-1. Sample/SDG Cross Reference

Field ID	Lab Sample ID	ASTM D2974-87	EPA 8270 by SIM
082613013	4083832009	X	X
082613014	4083832010	X	X
083013157	4084167005	X	X
083013158	4084167006	X	X
083013172	4084167016	X	X
083013173	4084167017	X	X
090313199	4084167037	X	X
090313200	4084167038	X	X
090313202	4084167039	X	X
090313203	4084167040	X	X
090313205	4084167041	X	X
090313206	4084167042	X	X

090513262	4084309012	X	X
091213516	4084767056	X	X
091213517	4084767057	X	X
091713627	4085070070	X	X
091713628	4085070071	X	X
091913728	4085231053	X	X
091913729	4085231054	X	X
092313771	4085484022	X	X
100213170	4086152002	X	X
100213171	4086152003	X	X
100213173	4086152004	X	X
100213174	4086152005	X	X
100213189	4086152015	X	X
100213190	4086152016	X	X
100213192	4086152017	X	X
100213206	4086152026	X	X
100213207	4086152027	X	X
100213208	4086152028	X	X
102913311	4087652026	X	X
102913312	4087652027	X	X
110113385	4088050007	X	X
110113387	4088050008	X	X
110413439	4088050042	X	X
110413440	4088050043	X	X
110413442	4088050044	X	X
110413453	4088050051	X	X
110413454	4088050052	X	X
110413455	4088050053	X	X
110413456	4088050054	X	X
110713492	4088242001	X	X
110713494	4088242002	X	X
111913285	4088891084	X	X
111913286	4088891085	X	X
112013322	4089037009	X	X
112013323	4089037010	X	X
112013341	4089037022	X	X
112013342	4089037023	X	X
112013353	4089037029	X	X
112013354	4089037030	X	X
112113372	4089037041	X	X
112113373	4089037042	X	X
112513478	4089286046	X	X
112513479	4089286047	X	X

120313597	4089522054	X	X
120313598	4089522055	X	X
120313600	4089522057	X	X
120313601	4089522058	X	X
120413625	4089663006	X	X
120413626	4089663007	X	X
120413639	4089663014	X	X
120413640	4089663015	X	X
120413647	4089663018	X	X

2.0 ORGANIC DATA REVIEW

Blank and spiked results were provided. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples. Sodium sulfate was used as the matrix for method blanks for the semivolatile organics (PAHs) analyses.

Sediment samples were analyzed for organic compounds following SW-846 Methods or laboratory developed methods as shown in Table 2-1.

Table 2-1. Organic Analytes and Methods Summary

Analytical Method	Analyte
EPA 8270 by SIM	Polycyclic Aromatic Hydrocarbons (PAH)

Samples were received on ice at or below 6°C. Samples were frozen upon receipt to preserve the holding time per client request.

2.1 SW-846 Method 8270C/SIM –PAHs

2.1.1 Summary

SW-846 Method 8270C/SIM employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM).

2.1.2 Method Blanks

The samples were prepared in multiple preparation batches. None of the method blanks associated with these batches showed any detectable contamination. Therefore, no data are qualified as a consequence of method blank data. The results for the method blanks are summarized in Table 2-2.

Table 2-2. Method 8270-SIM Method Blank Analytical Results Summary

<i>Parameter</i>	<i>Units</i>	<i>QC Batch: 158010</i>	<i>QC Batch: 158250</i>	<i>QC Batch: 158348</i>	<i>QC Batch: 158612</i>	<i>QC Batch: 158756</i>	<i>QC Batch: 158891</i>	<i>QC Batch: 159032</i>
2-Methylnaphthalene	µg/Kg	8.3 U						
Acenaphthene	µg/Kg	8.3 U						
Acenaphthylene	µg/Kg	7.5 U						
Anthracene	µg/Kg	8.6 U						
Benzo(a)anthracene	µg/Kg	5.8 U						
Benzo(a)pyrene	µg/Kg	6.0 U						
Benzo(b)fluoranthene	µg/Kg	8.3 U						
Benzo(g,h,i)perylene	µg/Kg	6.3 U						
Benzo(k)fluoranthene	µg/Kg	9.2 U						
Chrysene	µg/Kg	7.7 U						
Dibenz(a,h)anthracene	µg/Kg	6.1 U						
Fluoranthene	µg/Kg	8.3 U						
Fluorene	µg/Kg	8.3 U						
Indeno(1,2,3-cd)pyrene	µg/Kg	6.3 U						
Naphthalene	µg/Kg	8.3 U						
Phenanthrene	µg/Kg	8.3 U						
Pyrene	µg/Kg	8.3 U						

2.1.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. No data are qualified as a consequence of the continuing calibration data.

The peak shapes and chromatographic resolution for the isomers benzo(b)fluoranthene and benzo(k)fluoranthene evident in the sample chromatograms for the samples indicate that the two isomers are not adequately resolved to be quantitated separately as the laboratory attempted to do. The laboratory's report narratives noted this issue but stopped short of reporting the two isomers as a coeluting pair (as is done for m/p-xylene). Consequently all positive results for benzo(b)fluoranthene and benzo(k)fluoranthene in all samples for these two isomers are qualified as estimated ("J").

2.1.4 Internal Standard Areas

All internal standard areas met the method criteria.

2.1.5 Surrogate Compound Recoveries

Two surrogates, 2-fluorobiphenyl and terphenyl-d₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., PAHs), the surrogates reported should be adequate to monitor recovery in the analyses.

In many cases, surrogate compound recoveries are reported with a 0% or low recovery a due to sample dilution due to high analyte concentrations or high amounts of non-target analytes present in the samples. Sample dilution, when warranted, is not cause to further qualify sample results. In a few cases recoveries were low with only a 2x dilutions. Samples 112113373 and 120313597 will be qualified as estimated ("J"). In one case recoveries were less than ten percent, therefore detected analytes in sample 102913311 will be qualified as estimated ("J") and non-detects as unusable ("R"). (In this case there were no non-detects in this sample.)

The surrogate recoveries for all samples are presented in Table 2-3.

Table 2-3. Method 8270-SIM Surrogate Results Summary

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Terphenyl-d ₁₄	
			Limits:	40	130	40
4083832009	082613013	5	52		55	
4083832010	082613014	8	38	S0	45	
4084167005	083013157	40	49		56	
4084167006	083013158	10	50		51	
4084167016	083013172	5	47		48	
4084167017	083013173	20	0	S4	0	S4
4084167037	090313199	40	48		53	
4084167038	090313200	1600	0	S4	0	S4
4084167039	090313202	100	0	S4	0	S4
4084167040	090313203	80	58		62	
4084167041	090313205	10	64		67	
4084167042	090313206	10	73		77	
4084309012	090513262	8	46		51	
4084767056	091213516	20	57		64	
4084767057	091213517	80	0	S4	0	S4
4085070070	091713627	8	49		49	
4085070071	091713628	8	48		51	
4085231053	091913728	20	0	S4	0	S4
4085231054	091913729	20	0	S4	0	S4
4085484022	092313771	4	51		58	
4086152002	100213170	1000	0	S4	0	S4
4086152003	100213171	400	0	S4	0	S4
4086152004	100213173	2000	0	S4	0	S4

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Terphenyl-d ₁₄	
4086152005	100213174	800	0	S4	0	S4
4086152015	100213189	20	57		62	
4086152016	100213190	20	54		59	
4086152017	100213192	100	0	S4	0	S4
4086152026	100213206	80	0	S4	0	S4
4086152027	100213207	20	52		57	
4086152028	100213208	20	44		48	
4087652026	102913311	2	8	2q, S0	4	2q, S0
4087652027	102913312	20	61		65	
4088050007	110113385	40	46		46	
4088050008	110113387	80	0	S4	0	S4
4088050042	110413439	20	41		52	
4088050043	110413440	8	49		49	
4088050044	110413442	160	0	S4	0	S4
4088050051	110413453	8	46		47	
4088050052	110413454	5	50		52	
4088050053	110413455	160	0	S4	0	S4
4088050054	110413456	20	0	S4	0	S4
4088242001	110713492	200	0	S4	0	S4
4088242002	110713494	1	66		73	
4088891084	111913285	5	43		46	
4088891085	111913286	8	73		75	
4089037009	112013322	1	51		52	
4089037010	112013323	2	47		50	
4089037022	112013341	20	46		56	
4089037023	112013342	10	46		54	
4089037029	112013353	5	44		52	
4089037030	112013354	100	0	S4	0	S4
4089037041	112113372	1	60		56	
4089037042	112113373	2	33	1q, S0	33	1q, S0
4089286046	112513478	1	75		80	
4089286047	112513479	4	42		42	
4089522054	120313597	2	35	1q, S0	33	1q, S0
4089522055	120313598	20	0	S4	0	S4
4089522057	120313600	80	0	S4	0	S4
4089522058	120313601	200	0	S4	0	S4
4089663006	120413625	20	50		47	
4089663007	120413626	80	0	S4	0	S4

Lab Sample Number	Field ID	Dilution	2-Fluorobiphenyl		Terphenyl-d ₁₄	
4089663014	120413639	20	61		50	
4089663015	120413640	20	67		59	
4089663018	120413647	8	34	1q, S0	31	1q, S0

2.1.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on samples 082613014 and 110113387. Both of the samples were diluted to bring analytes in range, therefore having failing recoveries for many analytes. Both samples also gave RPD values exceeding the laboratory limits for the respective analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data alone. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The matrix spike/matrix spike duplicate results are summarized in Tables 2-4 through 2-5.

Table 2-4. Method 8270-SIM MS/MSD Recoveries

Parameter	MS Sample ID: 082613014			MSD Sample ID: 082613014			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	668	1080	-46	668	1030	-52	4	1380 M1	35
Acenaphthene	668	734	-10	668	805	0	9	803 M1	35
Acenaphthylene	668	497	30	668	420	19	17	296 M1	25
Anthracene	668	1010	-23	668	1040	-19	3	1170 M1	38
Benzo(a)anthracene	668	1230	-13	668	1600	43	27	1320 M1	30
Benzo(a)pyrene	668	1330	-8	668	1790	62	30	1380 M1	33
Benzo(b)fluoranthene	668	1200	18	668	1460	57	20	1080 M1	44
Benzo(g,h,i)perylene	668	766	-7	668	992	27	26	813 M1	33
Benzo(k)fluoranthene	668	1160	-50	668	1690	30	38	1500 M1, R1	37
Chrysene	668	1660	-9	668	1990	41	19	1720 M1	38
Dibenz(a,h)anthracene	668	443	25	668	507	34	14	278	27
Fluoranthene	668	2520	-104	668	2890	-49	14	3220 M1	50
Fluorene	668	676	3	668	642	-2	5	653 M1	32
Indeno(1,2,3-cd)pyrene	668	743	6	668	995	44	29	702 M1, R1	28
Naphthalene	668	638	2	668	666	6	4	627 M1	40
Phenanthrene	668	2630	-145	668	2730	-131	3	3600 M1	46
Pyrene	668	2690	-144	668	2910	-111	8	3650 M1	49

Table 2-5. Method 8270-SIM MS/MSD Recoveries Cont

Parameter	MS Sample ID: 110113387			MSD Sample ID: 110113387			RPD	Lab Sample Result (µg/Kg)	Max RPD
	Spike (µg/Kg)	MS Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	MSD Result (µg/Kg)	Rec (%)			
2-Methylnaphthalene	574	11700	-3330	574	21900	-1560	60	30900 M6, R1	35
Acenaphthene	574	3750	-967	574	6620	-469	55	9320 M6, R1	35
Acenaphthylene	574	1300J J	-223	574	1970	-107		2590 M6	25
Anthracene	574	3860	-847	574	5740	-520	39	8730 M6, R1	38
Benzo(a)anthracene	574	2910	-658	574	4780	-334	48	6690 M6, R1	30
Benzo(a)pyrene	574	2390	-565	574	4000	-286	50	5640 M6, R1	33
Benzo(b)fluoranthene	574	1850J J	-535	574	3060	-324		4920 M6	44
Benzo(g,h,i)perylene	574	1410J J	-264	574	2200	-126		2930 M6	33
Benzo(k)fluoranthene	574	1490J J	-208	574	2450	-42		2690 M6	37
Chrysene	574	3520	-786	574	5820	-385	49	8040 M6, R1	38
Dibenz(a,h)anthracene	574	844 U	-69	574	1010	4		992 JM6	27
Fluoranthene	574	4810	-1300	574	8340	-685	54	12300 M6, R1	50
Fluorene	574	2730	-738	574	5000	-344	59	6970 M6, R1	32
Indeno(1,2,3-cd)pyrene	574	1070J J	-243	574	1800	-116		2460 M6	28
Naphthalene	574	15800	-3550	574	28000	-1430	56	36200 M6, R1	40
Phenanthrene	574	10400	-3110	574	18400	-1710	56	28200 M6, R1	46
Pyrene	574	5950	-1570	574	9990	-872	51	15000 M6, R1	49

2.1.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. None of the analytes recovered outside of the acceptance limits established by the laboratory. No data are qualified due to failed LCS recoveries.

The laboratory control sample results are given in Table 2-6.

Table 2-6. Method 8270-SIM LCS Results Summary

Parameter	Rec Limits (%)		QC Batch: 158010			QC Batch: 158250			QC Batch: 158348		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	223	67	333	205	61	333	194	58
Acenaphthene	55	130	333	263	79	333	228	68	333	224	67
Acenaphthylene	55	130	333	254	76	333	219	66	333	214	64
Anthracene	66	130	333	280	84	333	237	71	333	235	71
Benzo(a)anthracene	55	130	333	231	69	333	239	72	333	223	67
Benzo(a)pyrene	56	130	333	284	85	333	336	101	333	239	72
Benzo(b)fluoranthene	53	130	333	230	69	333	319	96	333	214	64
Benzo(g,h,i)perylene	51	130	333	233	70	333	304	91	333	219	66
Benzo(k)fluoranthene	52	130	333	317	95	333	348	104	333	263	79
Chrysene	58	130	333	294	88	333	268	80	333	243	73
Dibenz(a,h)anthracene	55	130	333	212	64	333	315	95	333	202	60
Fluoranthene	62	130	333	262	79	333	233	70	333	228	68
Fluorene	58	130	333	254	76	333	226	68	333	221	66
Indeno(1,2,3-cd)pyrene	54	130	333	228	68	333	317	95	333	210	63
Naphthalene	41	130	333	237	71	333	201	60	333	201	60
Phenanthrene	60	130	333	250	75	333	223	67	333	227	68
Pyrene	51	130	333	258	77	333	252	76	333	229	69

Table 2-6. Method 8270-SIM LCS Results Summary Cont 1

Parameter	Rec Limits (%)		QC Batch: 158612			QC Batch: 158756			QC Batch: 158891		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	201	60	333	254	76	333	221	66
Acenaphthene	55	130	333	230	69	333	242	73	333	248	74
Acenaphthylene	55	130	333	221	66	333	241	72	333	242	73
Anthracene	66	130	333	247	74	333	260	78	333	264	79
Benzo(a)anthracene	55	130	333	232	70	333	241	72	333	242	73
Benzo(a)pyrene	56	130	333	251	75	333	283	85	333	269	81
Benzo(b)fluoranthene	53	130	333	233	70	333	260	78	333	223	67
Benzo(g,h,i)perylene	51	130	333	234	70	333	272	82	333	300	90
Benzo(k)fluoranthene	52	130	333	266	80	333	269	81	333	286	86
Chrysene	58	130	333	251	75	333	275	83	333	264	79
Dibenz(a,h)anthracene	55	130	333	245	73	333	266	80	333	324	97
Fluoranthene	62	130	333	242	73	333	255	77	333	254	76
Fluorene	58	130	333	231	69	333	246	74	333	251	75
Indeno(1,2,3-cd)pyrene	54	130	333	240	72	333	261	78	333	309	93
Naphthalene	41	130	333	199	60	333	237	71	333	233	70
Phenanthrene	60	130	333	234	70	333	257	77	333	247	74
Pyrene	51	130	333	232	69	333	249	75	333	230	69

Table 2-6. Method 8270-SIM LCS Results Summary Cont 2

Parameter	Rec Limits (%)		QC Batch: 159032		
	Lower	Upper	Spike (µg/Kg)	Result (µg/Kg)	Rec (%)
2-Methylnaphthalene	48	130	333	261	78
Acenaphthene	55	130	333	256	77
Acenaphthylene	55	130	333	259	78
Anthracene	66	130	333	267	80
Benzo(a)anthracene	55	130	333	261	78
Benzo(a)pyrene	56	130	333	276	83
Benzo(b)fluoranthene	53	130	333	235	70
Benzo(g,h,i)perylene	51	130	333	268	81
Benzo(k)fluoranthene	52	130	333	285	86
Chrysene	58	130	333	282	85
Dibenz(a,h)anthracene	55	130	333	265	79
Fluoranthene	62	130	333	251	75
Fluorene	58	130	333	262	78
Indeno(1,2,3-cd)pyrene	54	130	333	259	78
Naphthalene	41	130	333	243	73
Phenanthrene	60	130	333	260	78
Pyrene	51	130	333	300	90

2.1.8 Field Duplicates

Field duplicates were not provided with this set of data.

Data Validation Report

Chicago River Division Street Ambient

Sediment Sample Analyses Performed by

Pace Analytical, Green Bay
Pace Analytical, Minneapolis
Pace Analytical, Kansas City
and
TestAmerica, Burlington

Prepared for



Prepared by

SHEPHERD TECHNICAL SERVICES

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1.0 INTRODUCTION

All data validation was performed by Shepherd Technical Services following US EPA National Functional Guidelines (NFG), where applicable, using electronic deliverables.

Pace Analytical Services, Inc., Minneapolis performed analyses for alkylated polycyclic aromatic hydrocarbons (PAHs) and Total Petroleum Hydrocarbons/Hexane Extractable Materials. The Pace Minneapolis laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200011). The Pace Minneapolis laboratory also holds primary accreditation under the National Environmental Laboratory Accreditation Program (NELAP) by the Minnesota Department of Health Laboratory Accreditation Program (ID # 027-053-137).

Pace Analytical Services, Inc., Kansas City performed analyses for sulfide. The Pace Kansas City laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID # 001191). The Pace Kansas City laboratory also holds primary accreditation under the National Environmental Laboratory Accreditation Program (NELAP) by the Kansas Department of Health & Environment (ID # E-10116).

TestAmerica Burlington performed analyses for total organic carbon (TOC) and black carbon. The TestAmerica Burlington laboratory holds primary accreditation under the National Environmental Laboratory Accreditation Program (NELAP) by the New Jersey Department of Environmental Protection (ID # VT972).

Pace Analytical Services, Inc., Green Bay, WI performed the remainder of the analyses on the sediment samples. The Pace Green Bay laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200050). The Pace laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Florida Department of Health Laboratory Accreditation Program (ID #E87948).

A total of 68 sediment samples were collected during the period of March 2-9, 2011 at the Chicago River Division Street site. Upon collection, all samples were held securely prior to shipping overnight to the laboratory. Samples were organized into 6 sample delivery groups (laboratory lot numbers) and analyzed for the indicated parameters using the methods listed Sections 2 and 3. An equipment blank identified as sample 030311005 was also collected and submitted for analysis but was not analyzed.

In addition, all samples were analyzed using ASTM D2974-87 for Percent Moisture. The moisture data were used by the laboratory to correct the analytical results for moisture content in the sediments.

Table 1-1. Batch Identification Cross Reference

Lab SDG	Field ID	PAH by SIM	EPA 6020	ASTM D2974-87	EPA 350.1	EPA 7471	EPA 8015B	EPA 8260	EPA 8270	EPA 9012A	EPA 9034	EPA 9071	Carbon Black	Total Organic Carbon
4043076001	030211001	X	X	X		X		X	X	X				
4043075001	030211002	X	X	X		X								
4043076002	030211003	X	X	X		X								
4043075002	030211004	X	X	X		X								
4043076003	030211005	X	X	X		X								
4043075003	030211006	X	X	X		X								
4043076004	030211007	X	X	X		X		X	X	X				
4043076005	030211008	X	X	X		X		X	X	X				
4043075004	030211009	X	X	X		X								
4043076006	030211010	X	X	X		X								
4043075005	030211011	X	X	X		X								
4043076007	030211012	X	X	X		X								
4043076008	030211013	X	X	X		X								
4043076009	030211014	X	X	X	X	X	X	X	X	X	X	X	X	X
4043075006	030211015	X	X	X		X								
4043076010	030211016	X	X	X		X								
4043075007	030211017	X	X	X		X								
4043075008	030211018	X	X	X		X								
4043076011	030211019	X	X	X		X								
4043075009	030211020	X	X	X		X								
4043076012	030211021	X	X	X		X								
4043075010	030211022	X	X	X		X								
4043076013	030211023	X	X	X		X								
4043076014	030211024	X	X	X		X								
4043075011	030211025	X	X	X		X								
4043076015	030211026	X	X	X	X	X	X	X	X	X	X	X	X	X
4043076016	030211027	X	X	X		X								
4043075012	030211028	X	X	X		X								
4043076017	030211029	X	X	X		X								
4043075013	030211030	X	X	X		X								
4043076018	030211031	X	X	X		X								
4043075014	030211032	X	X	X		X								
4043076019	030211033	X	X	X		X								
4043076020	030211034	X	X	X		X								
4043076021	030311001	X	X	X		X		X	X	X				
4043075015	030311002	X	X	X		X								
4043076022	030311003	X	X	X		X				X				
4043075016	030311004	X	X	X		X								
4043076023	030311006	X	X	X		X				X				
4043075017	030311007	X	X	X		X								
4043076024	030311008	X	X	X		X				X				
4043262001	030811001	X	X	X		X		X	X	X				
4043262002	030811002	X	X	X	X	X	X	X	X	X	X	X	X	X
4043262003	030811003	X	X	X		X		X	X	X				
4043262004	030811004	X	X	X	X	X	X	X	X	X	X	X	X	X
4043262005	030811005	X	X	X	X	X	X	X	X	X	X	X	X	X
4043262006	030811006	X	X	X	X	X	X	X	X	X	X	X	X	X
4043262007	030811007	X	X	X		X		X	X	X				
4043262008	030811008	X	X	X		X		X	X	X				

Lab SDG	Field ID	PAH by SIM	EPA 6020	ASTM D2974-87	EPA 350.1	EPA 7471	EPA 8015B	EPA 8260	EPA 8270	EPA 9012A	EPA 9034	EPA 9071	Carbon Black	Total Organic Carbon
4043262009	030911001	X	X	X	X	X	X	X	X	X	X	X	X	X
4043262010	030911002	X	X	X		X		X	X	X				
4043262011	030911003	X	X	X		X		X	X	X				
4043262012	030911004	X	X	X		X		X	X	X				
4043262013	030911005	X	X	X		X		X	X	X				
4043262014	030911006	X	X	X		X		X	X	X				
4043262015	030911007	X	X	X		X		X	X	X				
4043262016	030911008	X	X	X		X		X	X	X				
4043262017	030911009	X	X	X	X	X	X	X	X	X	X	X	X	X
4043262018	030911010	X	X	X	X	X	X	X	X	X	X	X	X	X
4043262019	030911011	X	X	X	X	X	X	X	X	X	X	X	X	X
4043262020	030911012	X	X	X		X		X	X	X				
4043262021	030911013	X	X	X	X	X	X	X	X	X	X	X	X	X
4043262022	030911014	X	X	X		X		X	X	X				
4043262023	030911015	X	X	X		X		X	X	X				
4043262024	030911016	X	X	X		X		X	X	X				
4043262025	030911017	X	X	X		X		X	X	X				
4043262026	030911018	X	X	X		X		X	X	X				
4043262027	030911019	X	X	X		X		X	X	X				

2.0 INORGANIC DATA REVIEW

2.1 Summary

Blank, spiked, and duplicate results were provided. Overall, QC data indicated acceptable precision and accuracy. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of sediment samples.

2.2 Sample Receipt and Methodology

The sediment samples were analyzed for inorganic parameters following the methods cited in the table below. Percent Moisture was determined for the purposes of moisture correction.

Table 2-1. Inorganic Analytes and Methods Summary

Analyte	Analytical Method
Metals	EPA 6020A
Percent Moisture	ASTM D2974-87
Nitrogen, Ammonia	EPA 350.1
Mercury	EPA 7471A
Cyanide	EPA 9012A
Sulfide	EPA 9034
Oil and Grease	EPA 9071B
Carbon Black	Lloyd Kahn
Total Organic Carbon	Lloyd Kahn

The samples arrived at the laboratory properly preserved and in good condition. Minor discrepancies in the chain of custody documentation were noted by the laboratory upon receipt. All discrepancies were adequately resolved with the project team prior to commencing sample analyses. No sample data were impacted as a consequence of these issues. Some of the samples were held in the field for one or two days prior to delivery to the laboratory. All samples were analyzed within the prescribed holding times where holding times have been defined.

2.3 Calibration

Initial instrument calibrations for each of the methods were all within acceptance criteria.

All of the calibration verification checks (CCVs) performed for these analyses met the $\pm 10\%$ acceptance criterion ($\pm 15\%$ for TOC and black carbon) used by the laboratory and required by the methods. No data are qualified as a consequence of the calibration data.

2.4 Blanks

All of the initial and continuing calibration blanks (ICBs/CBBs) for each of the analytical methods gave results within the limits defined by the methods. Therefore, no data are qualified as a consequence of the calibration blank data.

Method blanks were prepared for each batch of samples digested, distilled, or extracted for analysis. None of the method blanks for ammonia, cyanide, sulfide, TOC, or carbon black showed any contamination above the detection limit.

The method blank for mercury for three of the six batches gave a value slightly above the limit of detection but below the reporting limit (limit of quantitation) for this parameter. Positive values for mercury below the reporting limit in these three batches will be qualified as not detected at the reporting limit.

The method blank for oil and grease for one of the three batches (QC batch 165081) gave a value slightly above the limit of detection but below the reporting limit (limit of quantitation) for this parameter. Positive values for oil and grease below the reporting limit in this batch will be qualified as not detected at the reporting limit.

Aluminum and zinc were detected in ICP/MS method blank for QC Batch 67201 at levels greater than the limit of detection, but less than the reporting limit (limit of quantitation). Zinc was also detected in ICP/MS method blank for each of the remaining four batches at a level greater than the limit of detection, but less than the reporting limit (limit of quantitation). Since the results for each of the samples associated with these method blanks were greater than ten times the values observed in the blanks, no action is taken to qualify any data.

The method blank results are summarized in Tables 2-2 through 2-8.

2.5 Laboratory Control Samples

Laboratory control samples (LCS) were analyzed with each of the data sets. The recovery limits used by the laboratory for LCS results are either those given in the method guidance or are based upon laboratory performance. All recoveries for all analytes were within the specified limits. Recoveries are given along with the acceptance limits in Tables 2-9 through 2-15.

2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were evaluated for each of the parameters.

All of the recoveries for ammonia and sulfide were well within the limits used by the laboratory.

Matrix spike/matrix spike duplicate analyses for ICP/MS metals were performed for five different samples in this data set. The MS and MSD recoveries for a number of metals failed to recover within the acceptance limits specified in the method in each of the five samples used for MS/MSD analyses. In the large majority of cases, the failures were assignable to a low spike concentration relative to the amount present in the parent sample (i.e., sample amount exceeded 4x the spike concentration). Subsequent post-digestion spikes all gave recoveries within limits. In those cases where the sample concentrations were less than 4x the spike amount and recoveries were outside of limits, the National Functional Guidelines direct the data be qualified as shown below.

Matrix Spike %R < 30% Post-digestion spike %R \geq 75%	Qualify affected results that are \geq MDL as estimated (J) and affected non-detects as estimated (UJ)
Matrix Spike %R 30-74% Post-digestion spike %R \geq 75%	Qualify affected results that are \geq MDL as estimated (J) affected non-detects as estimated (UJ)
Matrix Spike %R > 125% Post-digestion spike %R > 125%	Qualify affected results that are \geq MDL as estimated high (J+)
Matrix Spike %R > 125% Post-digestion spike %R \leq 125%	Qualify affected results that are \geq MDL as estimated (J)

Matrix spike/matrix spike duplicate analyses for mercury were performed for five different samples in this data set. The MS and MSD recoveries for most of these analyses failed to recover within the limits specified in the method. In three cases, the failures were assignable to a low spike concentration relative to the amount present in the parent sample (i.e., sample amount exceed 4x the spike concentration) and do not require data qualification. The remaining two cases are for samples 030811006 and 030911005. The January 2010 *National Functional Guidelines for Inorganic Data Review* recommend qualifying data based upon similarity of samples with the sample used for the MS/MSD analyses, including whether the samples have similar analyte concentrations present. Thus, samples with concentrations <1 mg/Kg (similar in range to the spiked samples) will be qualified based upon the results of the MS/MSD performed on samples 030811006 and 030911005. Consequently, affected results that are above the detection limit are qualified as estimated with a potential high bias (J+).

Matrix spike/matrix spike duplicate analyses for cyanide were performed for four different samples in this data set. The MS and MSD recoveries for most of these analyses failed to recover within the limits specified in the method. The actions for flagging found in the January 2010 *National Functional*

Guidelines for Inorganic Data Review are based upon performing a post-distillation spike on the samples in the event of a matrix spike recovery failure. SW-846 Method 9012B does not specifically require a post-distillation spike, but rather use of the method of standard additions, and consequently none were performed. (NB: Standard additions were not performed either). Consequently, results for cyanide analyses will be qualified as outlined below:

Matrix Spike %R < 30%	Qualify affected results that are \geq detection limit as estimated low (J-) and affected non-detects as unusable (R)
Matrix Spike %R 30-74%	Qualify affected results that are \geq detection limit as estimated low (J-) and affected non-detects as estimated (UJ)
Matrix Spike %R > 125%	Qualify affected results that are \geq detection limit as estimated high(J+) Non-detects are not qualified

Matrix spike analysis for Total Organic Carbon (TOC) and carbon black was performed using sample 030811006 in this data set. Matrix spiked duplicates were not included. At 181%, the recovery for Total Organic Carbon was well above the upper limit used by the laboratory, while the recovery for carbon black was within the laboratory limits. Consequently, positive values for TOC will be qualified as estimated with a potential high bias (J+).

Matrix spike and matrix spiked duplicate analyses for oil and grease were performed using samples 030911009 and 030211014 in this data set. However, only a matrix spike (i.e., no matrix spiked duplicate) was prepared and analyzed for sample 030211014. Recoveries for the MS performed on sample 030211014 was within the recovery limits, while the recoveries for the MS and MSD for sample 03911009 were well above the upper limit used by the laboratory. Consequently, positive values for oil and grease analyzed in the same batch as sample 03911009 will be qualified as estimated with a potential high bias (J+).

The MS/MSD data are given in Tables 2-16 through 2-22.

2.7 ICP Serial Dilutions

All serial dilution tests met the acceptance criterion defined in the test method. No data are qualified as consequence of the serial dilution results.

2.8 Field Duplicates

Field duplicates were collected and analyzed for all of the inorganic parameters. Field duplicates generally show excellent agreement for all of analytes where the values are above the sample quantitation limit. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate “NDs”, however, are reported with 0% RPDs.

The January 2010 *National Functional Guidelines for Inorganic Data Review* recommend qualifying ICP/MS metals, mercury, and cyanide data using a control limit of 20% for the Relative Percent

Difference (RPD) value calculated between the results of a laboratory duplicate pair. Recognizing the significant potential for variability inherent in attempting to subsample a soil matrix, the NFG allows for using 35% RPD for technical reviews. Based upon the criteria outlined in the NFG, any positive results for the field duplicates (only) would be qualified as estimated (J) and corresponding non-detects are qualified as estimated (UJ).

The January 2010 *National Functional Guidelines for Inorganic Data Review* do not contain any guidance on how to evaluate field duplicate results for ammonia, oil and grease, sulfide, TOC, carbon black, or moisture. Guidance found elsewhere (*EM 200-1-6, Environmental Quality - Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects, USACE*) allows for up to a 2x difference between the results before assessing the results as “disagreeing”. Based upon a 2x criterion, none of the field duplicate data for any of the remaining inorganic parameters are cause for qualification of data.

The results of the duplicate analyses are given in Tables 2-23 through 2-29. Values outside of the acceptance limits are shown in ***bold italic shaded*** font.

2.9 Total Solids/Percent Moisture

Total Solids were determined for each sediment sample. Duplicate determinations using duplicate aliquots were performed at appropriate frequencies. Precision values, as calculated by relative percent difference, between the duplicate determinations fell within expected performance limits. No data are qualified as a consequence of the Total Solids data.

Table 2-2. Total Metals Method Blank Results Summary

Analyte	QC Batch: 67201	QC Batch: 67204	QC Batch: 67656	QC Batch: 67658	QC Batch: 67727
	Result (mg/Kg)	Result (mg/Kg)	Result (mg/Kg)	Result (mg/Kg)	Result (mg/Kg)
Aluminum	1.2 J	25.0 U	25.0 U	25.0 U	25.0 U
Antimony	0.10 U				
Arsenic	0.10 U				
Barium	0.10 U				
Cadmium	0.10 U				
Chromium	0.10 U				
Copper	0.10 U				
Iron	25.0 U				
Lead	0.10 U				
Manganese	0.10 U				
Nickel	0.10 U				
Selenium	0.10 U				
Silver	0.050 U				
Vanadium	0.10 U				
Zinc	0.7 J	1.3 J	0.74 J	0.47 J	0.57 J

Table 2-3. Cyanide Method Blank Results Summary

QC Batch	Result (mg/Kg)
67423	0.60 U
67869	0.60 U
67871	0.60 U

Table 2-4. Mercury Method Blank Results Summary

QC Batch	Result (mg/Kg)
67375	0.010 U
37380	0.010 U
67913	0.0030J J
67978	0.0018J J
68159	0.010 U
68162	0.0024J J

Table 2-5. Nitrogen, Ammonia Method Blank Results Summary

QC Batch	Result (mg/Kg)
67210	15.0 U
68194	15.0 U

Table 2-6. Sulfide Method Blank Results Summary

QC Batch	Result (mg/Kg)
192524	50.0 U
193390	50.0 U

Table 2-7. Oil and Grease Method Blank Results Summary

QC Batch	Result (mg/Kg)
166358	250 U
164989	250 U
173275	250 U

Table 2-8. TOC/Carbon Black Method Blank Results Summary

QC Batch	Result (mg/Kg)
Total Organic Carbon	1000 U
Carbon Black	1000 U

Table 2-9. Total Metals Laboratory Control Sample Recoveries

Analyte	Spike Amount (mg/Kg)	QC Batch: 67727		QC Batch: 67658		QC Batch: 67021		QC Batch: 67204		QC Batch: 67656		Acceptance Limits (% Recovery)
		Amount Recovered (mg/Kg)	Percent Recovery									
Aluminum	500	518	104%	525	105%	495	99%	493	99%	513	103%	80 - 120
Antimony	50	50.4	101%	51.0	102%	49.0	98%	49.8	100%	50.5	101%	80 - 120
Arsenic	50	51.9	104%	51.7	103%	51.1	102%	51.2	102%	51.8	104%	80 - 120
Barium	50	50.7	101%	50.5	101%	49.8	100%	49.3	99%	50.4	101%	80 - 120
Cadmium	50	50.5	101%	51.4	103%	51.6	103%	52.8	106%	50.1	100%	80 - 120
Chromium	50	50.4	101%	51.2	102%	50.1	100%	50.7	101%	50.2	100%	80 - 120
Copper	50	51.6	103%	52.6	105%	49.6	99%	50.1	100%	52.0	104%	80 - 120
Iron	500	505	101%	513	103%	499	100%	503	101%	504	101%	80 - 120
Lead	50	51.3	103%	51.5	103%	50.6	101%	50.7	101%	50.8	102%	80 - 120
Manganese	50	51.1	102%	51.9	104%	49.7	99%	49.7	99%	51.0	102%	80 - 120
Nickel	50	50.6	101%	50.4	101%	49.9	100%	50.0	100%	50.0	100%	80 - 120
Selenium	50	52.6	105%	52.4	105%	51.7	103%	51.1	102%	52.4	105%	80 - 120
Silver	25	28.7	115%	28.0	112%	28.4	114%	29.1	116%	27.6	110%	80 - 120
Vanadium	50	49.4	99%	49.6	99%	48.9	98%	49.4	99%	49.1	98%	80 - 120
Zinc	50	54.0	108%	53.8	108%	53.1	106%	53.5	107%	52.4	105%	80 - 120

Table 2-10. Cyanide Laboratory Control Sample Recoveries

QC Batch	Spike Amount (mg/Kg)	Cyanide		Acceptance Limits (% Recovery)
		Amount Recovered (mg/Kg)	Percent Recovery	
67423	3	3.1	103%	80 - 120
67869	3	3.0	100%	80 - 120
67871	3	3.0	100%	80 - 120

Table 2-11. Mercury Laboratory Control Sample Recoveries

QC Batch	Spike Amount (mg/Kg)	Mercury		Acceptance Limits (% Recovery)
		Amount Recovered (mg/Kg)	Percent Recovery	
67375	0.25	0.24	96%	85 - 115
67380	0.25	0.23	92%	85 - 115
67913	0.25	0.25	100%	85 - 115
67978	0.25	0.25	100%	85 - 115
68159	0.25	0.26	104%	85 - 115
68162	0.25	0.27	108%	85 - 115

Table 2-12. Nitrogen, Ammonia Laboratory Control Sample Recoveries

QC Batch	Spike Amount (mg/Kg)	Nitrogen, Ammonia		Acceptance Limits (% Recovery)
		Amount Recovered (mg/Kg)	Percent Recovery	
67210	300	305	102%	80 - 120
68194	300	278	93%	80 - 120

Table 2-13. Sulfide Laboratory Control Sample Recoveries

QC Batch	Spike Amount (mg/Kg)	Sulfide		Acceptance Limits (% Recovery)
		Amount Recovered (mg/Kg)	Percent Recovery	
192524	400	400	100%	39 - 150
193390	400	400	100%	39 - 150

Table 2-14. Oil and Grease Laboratory Control Sample Recoveries

QC Batch	Spike Amount (mg/Kg)	Oil & Grease		Acceptance Limits (% Recovery)
		Amount Recovered (mg/Kg)	Percent Recovery	
173275	2000	1900	95%	78 - 114
164989	2000	1940	97%	78 - 114
166358	2000	1910	96%	78 - 114

Table 2-15. TOC/Carbon Black Laboratory Control Sample Recoveries

QC Batch	Spike Amount (mg/Kg)	Nitrogen, Ammonia		Acceptance Limits (% Recovery)
		Amount Recovered (mg/Kg)	Percent Recovery	
Total Organic Carbon	12600	13300	106%	75 - 125
Carbon Black	9900	10440	105%	50 - 150

Table 2-16. Total Metals MS/MSD Recoveries: Sample ID 030211016

Analyte	Sample ID: 030211016					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery	Amount Recovered (mg/Kg)	Percent Recovery	RPD			
Aluminum	8390	-427%	9420	-294%	12	775	75 - 125	20
Antimony	56.1	70%	61.3	77%	9	77.5	75 - 125	20
Arsenic	85.0	81%	87.4	84%	3	77.5	75 - 125	20
Barium	398	22%	639	333%	46	77.5	75 - 125	20
Cadmium	104	128%	105	129%	1	77.5	75 - 125	20
Chromium	309	23%	360	89%	15	77.5	75 - 125	20
Copper	390	52%	297	-68%	27	77.5	75 - 125	20
Iron	23700	-310%	24000	-271%	1	775	75 - 125	20
Lead	689	-26%	847	178%	21	77.5	75 - 125	20
Manganese	480	159%	416	76%	14	77.5	75 - 125	20
Nickel	246	256%	254	267%	3	77.5	75 - 125	20
Selenium	76.1	93%	75.3	92%	1	77.5	75 - 125	20
Silver	48.1	86%	47.9	86%	0	38.8	75 - 125	20
Vanadium	110	96%	115	103%	4	77.5	75 - 125	20
Zinc	1130	-477%	1190	-400%	5	77.5	75 - 125	20

Table 2-16. Total Metals MS/MSD Recoveries, cont.: Sample ID 030211031

Analyte	Sample ID: 030211031					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery	Amount Recovered (mg/Kg)	Percent Recovery	RPD			
Aluminum	17400	487%	17200	470%	1	1150	75 - 125	20
Antimony	78.5	63%	77.1	61%	2	115	75 - 125	20
Arsenic	158	101%	157	100%	1	115	75 - 125	20
Barium	654	110%	689	140%	5	115	75 - 125	20
Cadmium	134	105%	133	104%	1	115	75 - 125	20
Chromium	470	115%	462	108%	2	115	75 - 125	20
Copper	711	80%	720	88%	1	115	75 - 125	20
Iron	31500	165%	31100	130%	1	1150	75 - 125	20
Lead	996	110%	1030	139%	3	115	75 - 125	20
Manganese	417	101%	418	102%	0	115	75 - 125	20
Nickel	215	102%	213	100%	1	115	75 - 125	20
Selenium	114	95%	110	91%	4	115	75 - 125	20
Silver	79.5	112%	79.6	112%	0	57.8	75 - 125	20
Vanadium	172	106%	172	106%	0	115	75 - 125	20
Zinc	2720	104%	2690	78%	1	115	75 - 125	20

Table 2-16. Total Metals MS/MSD Recoveries, cont.: Sample ID 030811006

Analyte	Sample ID: 030811006					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery	Amount Recovered (mg/Kg)	Percent Recovery	RPD			
Aluminum	8170	206%	9340	341%	13	868	75 - 125	20
Antimony	66.4	65%	70.7	70%	6	86.8	75 - 125	20
Arsenic	92.7	101%	94.4	103%	2	86.8	75 - 125	20
Barium	312	222%	219	115%	35	86.8	75 - 125	20
Cadmium	121	88%	137	106%	12	86.8	75 - 125	20
Chromium	543	467%	254	134%	73	86.8	75 - 125	20
Copper	953	-28%	1120	165%	16	86.8	75 - 125	20
Iron	16200	138%	17200	253%	6	868	75 - 125	20
Lead	495	156%	491	151%	1	86.8	75 - 125	20
Manganese	310	114%	343	152%	10	86.8	75 - 125	20
Nickel	152	111%	160	120%	5	86.8	75 - 125	20
Selenium	87.0	98%	87.5	99%	1	86.8	75 - 125	20
Silver	49.6	102%	53.9	112%	8	43.5	75 - 125	20
Vanadium	112	109%	109	106%	3	86.8	75 - 125	20
Zinc	604	-67%	527	-156%	14	86.8	75 - 125	20

Table 2-16. Total Metals MS/MSD Recoveries, cont.: Sample ID 030911005

Analyte	Sample ID: 030911005					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery	Amount Recovered (mg/Kg)	Percent Recovery	RPD			
Aluminum	8750	287%	8740	286%	0	885	75 - 125	20
Antimony	68.2	72%	68.1	72%	0	88.5	75 - 125	20
Arsenic	99.1	102%	95.3	98%	4	88.5	75 - 125	20
Barium	268	-53%	265	-56%	1	88.5	75 - 125	20
Cadmium	100	98%	102	101%	2	88.5	75 - 125	20
Chromium	253	106%	13400	14962%	193	88.5	75 - 125	20
Copper	1680	1617%	332	94%	134	88.5	75 - 125	20
Iron	39200	531%	69700	3977%	56	885	75 - 125	20
Lead	351	-1084%	961	-394%	93	88.5	75 - 125	20
Manganese	510	159%	632	297%	21	88.5	75 - 125	20
Nickel	286	240%	6590	7363%	183	88.5	75 - 125	20
Selenium	81.8	90%	95.9	106%	16	88.5	75 - 125	20
Silver	51.6	102%	49.4	98%	4	44.3	75 - 125	20
Vanadium	111	103%	412	443%	115	88.5	75 - 125	20
Zinc	1130	-102%	5120	4407%	128	88.5	75 - 125	20

Table 2-16. Total Metals MS/MSD Recoveries, cont.: Sample ID 030211004

Analyte	Sample ID: 030211004					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery	Amount Recovered (mg/Kg)	Percent Recovery	RPD			
Aluminum	16600	658%	17000	710%	2	775	75 - 125	20
Antimony	64.8	80%	62.7	77%	3	77.5	75 - 125	20
Arsenic	133	138%	132	137%	1	77.5	75 - 125	20
Barium	538	148%	548	161%	2	77.5	75 - 125	20
Cadmium	113	138%	112	136%	1	77.5	75 - 125	20
Chromium	322	134%	347	166%	7	77.5	75 - 125	20
Copper	549	142%	504	84%	9	77.5	75 - 125	20
Iron	30500	13%	31300	116%	3	775	75 - 125	20
Lead	881	121%	908	156%	3	77.5	75 - 125	20
Manganese	444	132%	456	147%	3	77.5	75 - 125	20
Nickel	164	140%	162	137%	1	77.5	75 - 125	20
Selenium	111	138%	108	134%	3	77.5	75 - 125	20
Silver	78.0	150%	82.5	162%	6	38.8	75 - 125	20
Vanadium	144	140%	147	144%	2	77.5	75 - 125	20
Zinc	2160	103%	2060	-26%	5	77.5	75 - 125	20

Table 2-17. Total Cyanide MS/MSD Recoveries

Sample ID	Analyte: Cyanide					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery	Amount Recovered (mg/Kg)	Percent Recovery	RPD			
030311008	2.5	73%	2.5	73%	0	2.4	80 - 120	20
030811006	4.5	100%	0.85	-11%	136	3.3	80 - 120	20
030911005	3.4	102%	2	50%	52	2.7	80 - 120	20
030911019	0.53	-3%	0.57	-1%	7	2.4	80 - 120	20

Table 2-18. Mercury MS/MSD Recoveries

Sample ID	Analyte: Mercury					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery	Amount Recovered (mg/Kg)	Percent Recovery	RPD			
030211016	4.2	667%	2.4	205%	55	.39	85 - 115	20
030211031	21.8	52%	20	-259%	9	.58	85 - 115	20
030811006	1.1	118%	4	777%	114	.44	85 - 115	20
030211002	6.5	360%	4.8	20%	30	.5	85 - 115	20
030911005	1.3	114%	1.8	227%	32	.44	85 - 115	20

Table 2-19. Nitrogen, Ammonia MS/MSD Recoveries

Sample ID	Analyte Nitrogen, Ammonia					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery	Amount Recovered (mg/Kg)	Percent Recovery	RPD			
030211026	1360	93%	1360	93%	0	627	80 - 120	20
030811006	599	94%	599	94%	0	338	80 - 120	20

Table 2-20. Sulfide MS Recoveries

Sample ID	Analyte: Sulfide		Spike Amount	Accuracy Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery		
030211026	2770	97%	2710	15 - 150
030811006	886	94%	849	15 - 150

Table 2-21. Oil and Grease MS/MSD Recoveries

Sample ID	Analyte: Oil & Grease							Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/Kg)	Sample Amount	Percent Recovery	Amount Recovered (mg/Kg)	Sample Amount	Percent Recovery	RPD			
030911009	5420	1720	115%	NR	1720	NC	NC	3210	78 - 114	NA
030211014	4800	192	<i>139%</i>	6110	192	<i>178%</i>	24	3320	78 - 114	18

Table 2-22. TOC/Carbon Black MS Recoveries

Sample ID	Sample ID: 030811006		Spike Amount	Accuracy Limits (%)
	Amount Recovered (mg/Kg)	Percent Recovery		
Total Organic Carbon	123300	<i>181%</i>	43600	75 - 125
Carbon Black	51320	86%	28900	50 - 150

Table 2-23. Total Metals Field Duplicate Results

Analyte	Sample ID: 030211007 Result (mg/Kg)	Sample ID: 030211008 Result (mg/Kg)	RPD	Sample ID: 030211012 Result (mg/Kg)	Sample ID: 030211013 Result (mg/Kg)	RPD
Aluminum	6980	10500	40	10600	9030	16.0
Antimony	11.5	3.6	104.6	2.4	2.4	0
Arsenic	9.0	12.5	33	19.6	22.1	12.0
Barium	251	330	27	421	395	6.4
Cadmium	51.2	64.7	23	9.3	13.3	35
Chromium	269	319	17	203	318	44.1
Copper	415	366	13	276	360	26
Iron	20200	25900	25	26600	21800	20
Lead	532	558	5	706	728	3
Manganese	298	345	14.6	341	254	29.2
Nickel	140	131	7	52.9	54.0	2
Selenium	2.5	3.4	31	3.4	3.4	0
Silver	14.8	8.3	56.3	10.4	15.6	40
Vanadium	35.6	58.2	48	37.7	43.3	13.8
Zinc	954	1270	28	1320	1750	28.0

Table 2-23. Total Metals Field Duplicate Results, cont.

Analyte	Sample ID: 030211023 Result (mg/Kg)	Sample ID: 030211024 Result (mg/Kg)	RPD	Sample ID: 030211031 Result (mg/Kg)	Sample ID: 030211034 Result (mg/Kg)	RPD
Aluminum	10800	11200	3.6	11800	10500	11.7
Antimony	3.4	3.5	3	6.4	5.4	16.9
Arsenic	37.3	37.6	0.8	42.3	41.2	2.6
Barium	380	407	7	528	522	1.1
Cadmium	2.8	2.5	11	13.3	12.0	10.3
Chromium	491	530	7.6	338	318	6.1
Copper	258	284	10	619	580	7
Iron	31600	29100	8	29600	27800	6
Lead	620	678	9	870	852	2
Manganese	499	566	12.6	301	280	7.2
Nickel	36.6	37.3	2	98.0	93.2	5
Selenium	3.4	3.6	6	5.1	4.9	4
Silver	5.3	6.7	23	14.6	14.8	1.4
Vanadium	57.2	58.5	2.2	50.6	46.1	9.3
Zinc	942	979	4	2600	2500	3.9

Table 2-23. Total Metals Field Duplicate Results, cont.

Analyte	Sample ID: 030311006 Result (mg/Kg)	Sample ID: 030311008 Result (mg/Kg)	RPD	Sample ID: 030811004 Result (mg/Kg)	Sample ID: 030811005 Result (mg/Kg)	RPD
Aluminum	8450	5790	37.4	10100	10500	3.9
Antimony	2.2 J	1.7 J	26	0.98 J	0.98 J	0.0
Arsenic	15.1	12.7	17.3	5.8	6.0	3.4
Barium	303	259	16	163	178	8.8
Cadmium	24.1	22.5	7	13.9	12.8	8.2
Chromium	264	208	23.7	88.3	497	139.7
Copper	554	280	65.7	222	353	46
Iron	20300	28000	32	18200	17800	2
Lead	409	410	0	158	358	77.5
Manganese	370	313	16.7	293	243	18.7
Nickel	54.8	64.4	16	54.9	51.7	6
Selenium	2.4 J	2.2 J	9	2.6	2.7	4
Silver	2.7	2.5	8	7.3	7.5	2.7
Vanadium	41.0	32.1	24.4	23.2	33.1	35.2
Zinc	863	923	7	537	507	5.7

Table 2-23. Total Metals Field Duplicate Results, cont.

Analyte	Sample ID: 030911006 Result (mg/Kg)	Sample ID: 030911007 Result (mg/Kg)	RPD	Sample ID: 030911014 Result (mg/Kg)	Sample ID: 030911015 Result (mg/Kg)	RPD
Aluminum	4090	3610	12.5	7670	16800	74.6
Antimony	1.3 J	0.91 J	35	3.7	5.9	45.8
Arsenic	4.4	4.0	9.5	12.1	14.7	19.4
Barium	323	1140	112	270	364	29.7
Cadmium	5.8	6.8	16	18.6	22.4	18.5
Chromium	231	42.8	137.5	452	235	63.2
Copper	218	349	46	287	1180	122
Iron	15000	23800	45	23700	31700	29
Lead	209	141	39	466	717	42
Manganese	302	433	35.6	412	883	72.7
Nickel	37.7	24.3	43	63.2	83.7	28
Selenium	1.6 J	1.6 J	0	2.8	3.9	33
Silver	4.5	1.1	121.4	3.0	3.4	12.5
Vanadium	23.3	18.4	23.5	30.6	30.8	0.7
Zinc	529	1080	68	997	1660	49.9

Table 2-24. Total Cyanide Field Duplicate Results

Analyte	Sample ID 1	Result (mg/Kg)	Sample ID 2	Result (mg/Kg)	RPD
Cyanide	030211007	4.2	030211008	4.5	6.9
Cyanide	030311006	0.65	030311008	0.76 M1	15.6
Cyanide	030811004	0.63 J	030811005	1.1 U	NC
Cyanide	030911006	0.37 J	030911007	1.1	99.3
Cyanide	030911014	2.0	030911015	0.64	103.0

Table 2-25. Mercury Field Duplicate Results

Analyte	Sample ID 1	Result (mg/Kg)	Sample ID 2	Result (mg/Kg)	RPD
Mercury	030211007	1.8	030211008	1.8	0.0
Mercury	030211012	9.0	030211013	8.8	2.2
Mercury	030211023	4.8	030211024	5.4	11.8
Mercury	030211031	21.5 P6	030211034	23.5	8.9
Mercury	030311006	1.7	030311008	1.4	19.4
Mercury	030811004	0.80	030811005	0.67	17.7
Mercury	030911006	0.71	030911007	8.5	169.2
Mercury	030911014	4.9	030911015	2.4	68.5

Table 2-26. Nitrogen, Ammonia Field Duplicate Results

Analyte	Sample ID 1	Result (mg/Kg)	Sample ID 2	Result (mg/Kg)	RPD
Nitrogen, Ammonia	030811004	471	030811005	508	7.6

Table 2-27. Sulfide Field Duplicate Results

Analyte	Sample ID 1	Result (mg/Kg)	Sample ID 2	Result (mg/Kg)	RPD
Sulfide	030811004	126 U	030811005	123 U	2.4

Table 2-28. Oil and Grease Field Duplicate Results

Analyte	Sample ID 1	Result (mg/Kg)	Sample ID 2	Result (mg/Kg)	RPD
Oil & Grease	030811004	1120	030811005	1930	53.1

Table 2-29. TOC/Carbon Black Field Duplicate Results

Analyte	Sample ID 1	Result (mg/Kg)	Sample ID 2	Result (mg/Kg)	RPD
Total Organic Carbon	030811004	80300	030811005	80700	0.5
Carbon black	030811004	34200	030811005	33700	1.5

3.0 ORGANIC DATA REVIEW

Blank, spiked, and duplicate results were provided. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples. Organic free water with Ottawa sand was used as the matrix for VOC method blank analysis. Organic free water with Ottawa sand and sodium sulfate was used as the matrix for method blanks for the semivolatile organics (PAHs, phenols, TPH) analyses.

Sediment samples were analyzed for organic compounds following SW-846 Methods as shown in Table 3-1.

Table 3-1. Organic Analytes and Methods Summary

Analyte	Analytical Method
Purgeable Volatile Organic Compounds (PVOC)	SW-846 8260B
Polycyclic Aromatic Hydrocarbons (PAH)	Alkylated PAH by SIM
TPH	EPA 8015B
Phenols	SW-846 8270C

All samples were received by the laboratory in good condition and intact. Therefore, no data are qualified based upon sample receipt conditions.

All samples extractions and analyses were performed within the EPA-established holding times. No data are qualified based upon sample holding times.

3.1 SW-846 Method 8260B – Purgeable Volatile Organic Compounds

3.1.1 Summary

SW-846 Method 8260B employs gas chromatographic separation with a mass spectrometer as a detector.

3.1.2 Method Blanks

The samples were analyzed in three analytical batches. None of the method blanks associated with these analytical batches showed any detectable contamination. Therefore, no data are qualified as a consequence of the method blank data. The method blank data are summarized in Table 3-2.

3.1.2 Trip Blanks

No trip blanks were provided with this sample set. Therefore, no data are qualified as a consequence of any trip blank data.

3.1.4 Calibration

All initial calibration criteria were met for all compounds. All analytes fit first order linear regression curves and gave average response factors (RFs) with <15% RSD over the average. Therefore average RFs were used in sample quantitation. No data are qualified as a result of the initial calibration data.

For evaluating calibration verifications, the January 2005 CLP National Functional Guidelines have established a $\pm 40\%$ drift or difference acceptability criterion for analytes known to exhibit poor response and a $\pm 25\%$ drift or difference criterion for all other target analytes. None of the analytes of concern in this investigation are considered to exhibit poor response. The calibration verification associated with this data set did not exceed the $\pm 25\%$ difference criterion in place for all other target analytes. Consequently, no data are qualified as a result of the calibration verification data.

3.1.5 Surrogate Compound Recoveries

Three surrogate compounds, 4-bromofluorobenzene, toluene-*d*₈, and dibromofluoromethane were spiked into each field sample to monitor analyte recovery in the analytical system. The surrogates used by the laboratory are acceptable to measure recovery under EPA SW-846 guidance for this analytical method. Recoveries for all surrogates for all samples were well within the acceptance limits and are presented in Table 3-3.

3.1.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed for two samples, 030811006 and 030911005, in this sample set. None of the target compounds recovered outside of the limits established by the laboratory.

No action is defined for flagging data based on the MS/MSD results or RPD values alone. Since all of the recoveries were within acceptance limits, no data are qualified as a result of the matrix spike/matrix spike duplicate analyses. The MS/MSD results are summarized in Tables 3-4.

3.1.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed on each day of analysis and for each analytical batch. None of the analytes recovered outside of the acceptance limits established by the laboratory. No data are qualified due to failed LCS recoveries. The laboratory control sample analyses results are given in Table 3-5.

3.1.8 Field Duplicates

Field duplicates generally show excellent agreement for all of analytes with all RPD values <50%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate "NDs", however, are reported with 0% RPDs.

No results for any field samples pair are qualified based upon field duplicate data.

The results of the duplicate analyses are given in Table 3-6.

Table 3-2. VOC Blank Analytical Results Summary

Analyte	QC Batch: 67140	QC Batch: 67533	QC Batch: 67536	LOD	LOQ
	Result (µg/Kg)	Result (µg/Kg)	Result (µg/Kg)		
1,2,4-Trimethylbenzene	50.0 U	50.0 U	50.0 U	50.0	50.0
1,3,5-Trimethylbenzene	50.0 U	50.0 U	50.0 U	50.0	50.0
Benzene	20.0 U	20.0 U	20.0 U	20.0	20.0
Ethylbenzene	25.0 U	25.0 U	25.0 U	25.0	25.0
<i>m&p</i> -Xylene	50.0 U	50.0 U	50.0 U	50.0	50.0
Methyl- <i>tert</i> -butyl ether	50.0 U	50.0 U	50.0 U	50.0	50.0
<i>o</i> -Xylene	25.0 U	25.0 U	25.0 U	25.0	25.0
Toluene	50.0 U	50.0 U	50.0 U	50.0	50.0
Xylene (Total)	75.0 U	75.0 U	75.0 U	75.0	75.0

Table 3-3. Surrogate Compound Recovery Data for Volatile Organics

Lab SDG	Field ID	4-Bromofluorobenzene 55 - 141	Dibromofluoromethane 67 - 143	Toluene-<i>d</i>₈ 67 - 132
4043076001	030211001	97	96	101
4043076004	030211007	90	89	92
4043076005	030211008	102	100	107
4043076009	030211014	111	107	114
4043076015	030211026	122	120	128
4043076021	030311001	80	79	85
4043262001	030811001	97	106	97
4043262002	030811002	94	101	91
4043262003	030811003	95	109	99
4043262004	030811004	94	105	96
4043262005	030811005	83	93	87
4043262006	030811006	112	121	115
4043262007	030811007	71	84	73
4043262008	030811008	91	100	91
4043262009	030911001	94	104	95
4043262010	030911002	94	102	93
4043262011	030911003	107	119	108
4043262012	030911004	101	108	103
4043262013	030911005	90	86	94
4043262014	030911006	94	104	96
4043262015	030911007	96	105	99
4043262016	030911008	77	74	85
4043262017	030911009	90	86	97
4043262018	030911010	86	83	92
4043262019	030911011	91	86	97
4043262020	030911012	75	75	82
4043262021	030911013	94	91	101
4043262022	030911014	77	71	79
4043262023	030911015	84	81	90
4043262024	030911016	92	86	97
4043262025	030911017	77	70	83
4043262026	030911018	96	92	100
4043262027	030911019	87	80	92

Table 3-4. Method 8260B MS/MSD Recoveries

Analyte	Sample ID: 030811006					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
Benzene	4260	97%	4290	98%	1	4390	66 - 130	20
Ethylbenzene	4840	110%	4990	114%	3	4390	62 - 154	20
m&p-Xylene	10100	115%	10400	119%	3	8770	68 - 147	20
o-Xylene	5070	115%	5240	119%	3	4390	69 - 137	20
Toluene	4490	101%	4780	107%	6	4390	64 - 147	20
Xylene (Total)	15100	114%	15700	119%	4	13200	70 - 131	20

Analyte	Sample ID: 030911005					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
Benzene	4140	93%	3920	88%	5	4430	66 - 130	20
Ethylbenzene	4360	97%	4350	97%	0	4430	62 - 154	20
m&p-Xylene	9080	102%	8990	101%	1	8850	68 - 147	20
o-Xylene	4720	106%	4630	104%	2	4430	69 - 137	20
Toluene	6730	84%	7140	94%	6	4430	64 - 147	20
Xylene (Total)	13800	103%	13600	101%	1	13300	70 - 131	20

Table 3-5. Laboratory Control Sample Recoveries

Analyte	Spike Amount (µg/Kg)	QC Batch: 67140		QC Batch: 67533		QC Batch: 67536		Acceptance Limits (% Recovery)
		Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	
Benzene	2500	2420	97%	2470	99%	2320	93%	70 - 130
Ethylbenzene	2500	2550	102%	2690	108%	2490	100%	70 - 130
Styrene	5000	5300	106%	5590	112%	5160	103%	70 - 130
Toluene	2500	2700	108%	2770	111%	2660	106%	70 - 130
Vinyl chloride	2500	2640	106%	2510	100%	2590	104%	70 - 130
Xylene (Total)	7500	7990	107%	8360	111%	7820	104%	70 - 130

Table 3-6. PVOC Field Duplicate Results

Analyte	Sample ID: 030211007 Result (µg/Kg)	Sample ID: 030211008 Result (µg/Kg)	RPD	Sample ID: 030811004 Result (µg/Kg)	Sample ID: 030811005 Result (µg/Kg)	RPD
1,2,4-Trimethylbenzene	110 U	114 U	0.0	125 U	121 U	0.0
1,3,5-Trimethylbenzene	110 U	114 U	0.0	125 U	121 U	0.0
Benzene	43.9 U	45.6 U	0.0	49.9 U	48.3 U	0.0
Ethylbenzene	54.9 U	56.9 U	0.0	62.3 U	60.4 U	0.0
<i>m&p</i> -Xylene	110 U	114 U	0.0	125 U	121 U	0.0
Methyl- <i>tert</i> -butyl ether	110 U	114 U	0.0	125 U	121 U	0.0
<i>o</i> -Xylene	54.9 U	56.9 U	0.0	62.3 U	60.4 U	0.0
Toluene	101 J	82.4 J	20.3	39.0 J	56.3 J	36.3
Xylene (Total)	165 U	171 U	0.0	187 U	181 U	0.0

Analyte	Sample ID: 030911006 Result (µg/Kg)	Sample ID: 030911007 Result (µg/Kg)	RPD	Sample ID: 030911014 Result (µg/Kg)	Sample ID: 030911015 Result (µg/Kg)	RPD
1,2,4-Trimethylbenzene	44.5 J	98.4 U	NC	344	226	41.4
1,3,5-Trimethylbenzene	110 U	98.4 U	0.0	266	191	32.8
Benzene	44.1 U	39.3 U	0.0	30.3 J	21.9 J	32.2
Ethylbenzene	55.2 U	49.2 U	0.0	52.8 J	35.4 J	39.5
<i>m&p</i> -Xylene	110 U	98.4 U	0.0	148	95.4	43.2
Methyl- <i>tert</i> -butyl ether	110 U	98.4 U	0.0	121 U	91.6 U	0.0
<i>o</i> -Xylene	17.0 J	49.2 U	NC	81.9	54.3	40.5
Toluene	235	309	27.2	1040	647	46.6
Xylene (Total)	165 U	148 U	0.0	230	150	42.1

3.2 SW-846 Method 8270C/SIM –Alkylated PAHs

3.2.1 Summary

SW-846 Method 8270C employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM). As applied in this analysis, the method will provide results for isomer specific alkylated PAHs as well as alkylated PAHs by class (e.g., methyl substituted phenanthrenes).

3.2.2 Method Blanks

The samples were prepared in six different preparation batches. Neither of the method blanks associated with these sample analyses gave a positive result for any of the analytes above the reporting limits. Therefore, no data are qualified due to the blank contamination.

The results for the method blanks are summarized in Table 3-7.

3.2.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results. Various alkylated PAHs are quantitated and reported as a non-specific isomer class (e.g., “C2-Phenanthrenes/Anthracenes”) using a response factor from a specific known isomer.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for alkylated PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. No data are qualified as a consequence of the continuing calibration data.

3.2.4 Surrogate Compound Recoveries

Three surrogates, nitrobenzene-*d*₅, 2-fluorobiphenyl and terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., PAHs), the surrogates reported should be adequate to monitor recovery in the analyses.

Many of the samples had one or more surrogates recover outside of the recovery limits used by the laboratory. All of the failed recoveries were due to sample dilutions either from high target

analyte concentrations or due to elevated reporting limits necessitated by the elevated extract final volume.

Guidance provided in the current (2008) National Functional Guidelines applies only to use of specific Deuterated Monitoring Compounds rather than the surrogates used in these analyses. Guidance available in the 1994 NFG allows one surrogate outside of acceptance limits before qualifying data. In those cases where two or more surrogates are recovered outside of the recovery limits, sample results will be qualified as estimated (J or UJ).

The surrogate recoveries for all samples are presented in Table 3-8. Values outside of the acceptance limits are shown in ***bold italic shaded*** font.

3.2.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on seven of the samples.

The large majority of the compounds reported for the matrix spike analyses failed to recover within the limits established by the laboratory. Due to the high concentration of the target PAHs relative to the spike concentrations, the recoveries in almost all cases are poor and are not useful for assessing method performance in the sample matrix.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data. The matrix spike/matrix spike duplicate results are summarized in Tables 3-9 through 3-15.

3.2.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. All of the analytes for all of the laboratory control samples recovered within the limits used by the laboratory.

The laboratory control sample results are given in Tables 3-16 and 3-17.

3.2.7 Field Duplicates

Field duplicates generally show good agreement for all of analytes. Most duplicate RPD values are < 50% indicating very good agreement between the results.

For the remaining duplicate pairs, some of the precision values are in excess of 50% RPD and some even exceed 100% RPD. The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for semivolatiles analyses.

However, guidance provided elsewhere (*EM 200-1-6, Environmental Quality - Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste HTRW Projects, U.S. Army Corps of Engineers*) allows for up to a 4x difference between the results from soil sample analyses before assessing the results as “disagreeing”. All of the duplicate pair results fall within a factor of 4 from each other.

Based upon these observations, no results for any field samples associated with these duplicate pairs are qualified based upon field duplicate data.

The results of the duplicate analyses are given in Tables 3-18 through 3-21.

Table 3-7. Method Blank Analytical Results Summary

Analyte	QC Batch: 164715	QC Batch: 164850	QC Batch: 164939	LOD	LOQ
	Result (µg/Kg)	Result (µg/Kg)	Result (µg/Kg)		
Acenaphthene	10.0 U	10.0 U	10.0 U	5.0	10.0
Acenaphthylene	10.0 U	10.0 U	10.0 U	5.0	10.0
Anthracene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(a)anthracene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(a)pyrene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(a,b)fluoranthene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(e)pyrene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(g,h,i)perylene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(k)fluoranthene	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Chrysenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Fluoranthenes/Pyrenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Fluorenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Naphthalenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Phenanthrenes/Anthracenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C2-Chrysenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C2-Fluorenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C2-Naphthalenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C2-Phenanthrenes/Anthracenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C3-Chrysenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C3-Fluorenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C3-Naphthalenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C3-Phenanthrenes/Anthracenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C4-Chrysenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C4-Naphthalenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C4-Phenanthrenes/Anthracenes	10.0 U	10.0 U	10.0 U	5.0	10.0
Dibenz(a,h)anthracene	10.0 U	10.0 U	10.0 U	5.0	10.0

Analyte	QC Batch: 164715	QC Batch: 164850	QC Batch: 164939	LOD	LOQ
	Result (µg/Kg)	Result (µg/Kg)	Result (µg/Kg)		
Fluoranthene	10.0 U	10.0 U	10.0 U	5.0	10.0
Fluorene	10.0 U	10.0 U	10.0 U	5.0	10.0
Indeno(1,2,3-cd)pyrene	10.0 U	10.0 U	10.0 U	5.0	10.0
Naphthalene	10.0 U	10.0 U	10.0 U	5.0	10.0
Perylene	10.0 U	10.0 U	10.0 U	5.0	10.0
Phenanthrene	10.0 U	10.0 U	10.0 U	5.0	10.0
Pyrene	10.0 U	10.0 U	10.0 U	5.0	10.0

Table 3-7. Method Blank Analytical Results Summary, cont.

Analyte	QC Batch: 165033	QC Batch: 165092	QC Batch: 165321	LOD	LOQ
	Result (µg/Kg)	Result (µg/Kg)	Result (µg/Kg)		
Acenaphthene	10.0 U	10.0 U	10.0 U	5.0	10.0
Acenaphthylene	10.0 U	10.0 U	10.0 U	5.0	10.0
Anthracene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(a)anthracene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(a)pyrene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(a,b)fluoranthene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(e)pyrene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(g,h,i)perylene	10.0 U	10.0 U	10.0 U	5.0	10.0
Benzo(k)fluoranthene	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Chrysenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Fluoranthenes/Pyrenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Fluorenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Naphthalenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C1-Phenanthrenes/Anthracenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C2-Chrysenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C2-Fluorenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C2-Naphthalenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C2-Phenanthrenes/Anthracenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C3-Chrysenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C3-Fluorenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C3-Naphthalenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C3-Phenanthrenes/Anthracenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C4-Chrysenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C4-Naphthalenes	10.0 U	10.0 U	10.0 U	5.0	10.0
C4-Phenanthrenes/Anthracenes	10.0 U	10.0 U	10.0 U	5.0	10.0
Chrysene/Triphenylene	10.0 U	10.0 U	10.0 U	5.0	10.0

Analyte	QC Batch: 165033	QC Batch: 165092	QC Batch: 165321	LOD	LOQ
	Result (µg/Kg)	Result (µg/Kg)	Result (µg/Kg)		
Dibenz(a,h)anthracene	10.0 U	10.0 U	10.0 U	5.0	10.0
Fluoranthene	10.0 U	10.0 U	10.0 U	5.0	10.0
Fluorene	10.0 U	10.0 U	10.0 U	5.0	10.0
Indeno(1,2,3-cd)pyrene	10.0 U	10.0 U	10.0 U	5.0	10.0
Naphthalene	10.0 U	10.0 U	10.0 U	5.0	10.0
Perylene	10.0 U	10.0 U	10.0 U	5.0	10.0
Phenanthrene	10.0 U	10.0 U	10.0 U	5.0	10.0
Pyrene	10.0 U	10.0 U	10.0 U	5.0	10.0
Total PAHs	780 U	780 U	780 U	390	780
Total PAHs (Alkylated Only)	330 U	330 U	330 U	165	330

Table 3-8. Alkylated PAH Surrogate Recoveries

Lab SDG	Field ID	2-Fluorobiphenyl 40 - 120	Nitrobenzene- <i>d</i> ₅ 40 - 120	Terphenyl- <i>d</i> ₁₄ 40 - 120
4043076001	030211001	103	<i>131 P3, S2</i>	<i>130 S2</i>
4043075001	030211002	98	95 P3	114
4043076002	030211003	100	<i>323 P3, S2</i>	<i>131 S2</i>
4043075002	030211004	101	<i>503 P3, S2</i>	<i>153 S2</i>
4043076003	030211005	97	<i>244 P3, S2</i>	119
4043075003	030211006	97	<i>375 P3, S2</i>	<i>135 S2</i>
4043076004	030211007	96	<i>197 P3, S2</i>	<i>127 S2</i>
4043076005	030211008	95	<i>264 P3, S2</i>	<i>125 S2</i>
4043075004	030211009	100	<i>513 P3, S2</i>	<i>136 S2</i>
4043076006	030211010	89	<i>469 P3, S2</i>	<i>126 S2</i>
4043075005	030211011	99	<i>369 P3, S2</i>	<i>145 S2</i>
4043076007	030211012	99	<i>426 P3, S2</i>	<i>135 S2</i>
4043076008	030211013	99	<i>472 P3, S2</i>	<i>151 S2</i>
4043076009	030211014	92	<i>121 P3, S2</i>	118
4043075006	030211015	98	117 P3	<i>122 S2</i>
4043076010	030211016	112	<i>209 P3, S2</i>	<i>145 S2</i>
4043075007	030211017	95	<i>339 P3, S2</i>	<i>124 S2</i>
4043075008	030211018	101	<i>611 P3, S2</i>	<i>136 S2</i>
4043076011	030211019	95	<i>415 P3, S2</i>	<i>139 S2</i>
4043075009	030211020	93	<i>209 P3, S2</i>	111
4043076012	030211021	90	<i>194 P3, S2</i>	116
4043075010	030211022	99	108 P3	117

Lab SDG	Field ID	2-Fluorobiphenyl 40 - 120	Nitrobenzene- <i>d</i> ₅ 40 - 120	Terphenyl- <i>d</i> ₁₄ 40 - 120
4043076013	030211023	97	<i>166 P3, S2</i>	<i>122 S2</i>
4043076014	030211024	96	<i>187 P3, S2</i>	<i>128 S2</i>
4043075011	030211025	93	<i>131 P3, S2</i>	117
4043076015	030211026	93	<i>292 P3, S2</i>	115
4043076016	030211027	92	<i>450 P3, S2</i>	117
4043075012	030211028	97	<i>773 P3, S2</i>	<i>133 S2</i>
4043076017	030211029	95	<i>554 P3, S2</i>	<i>121 S0</i>
4043075013	030211030	97	<i>748 P3, S2</i>	<i>135 S2</i>
4043076018	030211031	106	<i>772 P3, S2</i>	<i>146 S2</i>
4043075014	030211032	94	<i>288 P3, S2</i>	<i>142 S2</i>
4043076019	030211033	100	<i>121 P3, S2</i>	<i>121 S2</i>
4043076020	030211034	91	<i>1320 P3, S2</i>	<i>140 S2</i>
4043076021	030311001	<i>0 S2</i>	74 D3, P3	<i>0 S2</i>
4043075015	030311002	97	<i>396 P3, S2</i>	<i>147 S2</i>
4043076022	030311003	98	<i>127 P3, S2</i>	<i>124 S2</i>
4043075016	030311004	91	90 P3	<i>137 S2</i>
4043076023	030311006	100	116 P3	<i>131 S2</i>
4043075017	030311007	86	91 P3	102
4043076024	030311008	101	<i>141 P3, S2</i>	<i>144 S2</i>
4043262001	030811001	84	92 P3	100
4043262002	030811002	103	<i>129 P3, S2</i>	117
4043262003	030811003	97	86 P3	115
4043262004	030811004	93	87 P3	113
4043262005	030811005	<i>194 S2</i>	<i>162 P3, S2</i>	<i>235 S2</i>
4043262006	030811006	94	72 P3	113
4043262007	030811007	99	<i>146 P3, S2</i>	118
4043262008	030811008	98	104 P3	<i>124 S2</i>
4043262009	030911001	92	78 P3	116
4043262010	030911002	100	84 P3	115
4043262011	030911003	101	<i>173 P3, S2</i>	113
4043262012	030911004	93	92 P3	116
4043262013	030911005	100	109 P3	<i>132 S2</i>
4043262014	030911006	99	101 P3	115
4043262015	030911007	100	97 P3	108
4043262016	030911008	96	79 P3	115
4043262017	030911009	97	82 P3	114
4043262018	030911010	84	73 P3	110

Lab SDG	Field ID	2-Fluorobiphenyl 40 - 120	Nitrobenzene- <i>d</i> ₅ 40 - 120	Terphenyl- <i>d</i> ₁₄ 40 - 120
4043262019	030911011	95	77 P3	110
4043262020	030911012	95	82 P3	111
4043262021	030911013	96	220 P3, S2	107
4043262022	030911014	99	130 P3, S2	114
4043262023	030911015	101	161 P3, S2	124 S2
4043262024	030911016	95	207 P3, S2	115
4043262025	030911017	96	107 P3	112
4043262026	030911018	97	320 P3, S2	110
4043262027	030911019	92	113 P3	114

*P3= Flag applied by the laboratory to indicate sample extract could not be concentrated to the routine final volume, resulting in elevated reporting limits.

*S2= Flag applied by the laboratory to indicate surrogate recovery outside laboratory control limits due to matrix interferences

Table 3-9. Alkylated PAH MS/MSD Recoveries Sample 030211014

Analyte	Sample ID: 030211014					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
Acenaphthene	5460	4900%	6140	6600%	12	41.7	50 - 125	30
Acenaphthylene	1280	0%	4260	7140%	108	41.7	50 - 125	30
Anthracene	12100	11700%	29700	539000%	84	41.7	50 - 125	30
Benzo(a)anthracene	27900	31700%	75100	145000%	92	41.7	50 - 125	30
Benzo(a)pyrene	23000	25000%	66500	130000%	97	41.7	50 - 125	30
Benzo(a,b)fluoranthene	38600	47000%	181000	331000%	130	50.1	50 - 125	30
Benzo(e)pyrene	16800	21200%	43800	85900%	89	41.7	50 - 125	30
Benzo(g,h,i)perylene	13600	17000%	31100	58600%	78	41.7	50 - 125	30
Benzo(k)fluoranthene	13900	17000%	24700	42600%	56	41.7	50 - 125	30
Fluoranthene	60200	57000%	107000	169000%	56	41.7	50 - 125	30
Fluorene	7520	8220%	10600	15600%	34	41.7	50 - 125	30
Indeno(1,2,3-cd)pyrene	12000	15000%	26700	50300%	76	41.7	50 - 125	30
Naphthalene	4780	4200%	3370	815%	35	41.7	50 - 125	30
Perylene	5840	7620%	15400	30600%	90	41.7	50 - 125	30
Phenanthrene	50100	52000%	80600	125000%	47	41.7	50 - 125	30
Pyrene	48400	43900%	89600	143000%	60	41.7	50 - 125	30

Table 3-10. Alkylated PAH MS/MSD Recoveries Sample 030211031

Analyte	Sample ID: 030211031					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
Acenaphthene	5500	776%	4480	-983%	20	58	50 - 125	30
Acenaphthylene	7730	1020%	7060	-138%	9	58	50 - 125	30
Anthracene	10700	690%	9300	-1720%	14	58	50 - 125	30
Benzo(a)anthracene	17500	2240%	13900	-39770%	23	58	50 - 125	30
Benzo(a)pyrene	13900	1900%	11600	-2070%	18	58	50 - 125	30
Benzo(a,b)fluoranthene	14400	3450%	13800	2590%	4	69.6	50 - 125	30
Benzo(e)pyrene	9300	586%	8200	-1310%	13	58	50 - 125	30
Benzo(g,h,i)perylene	6630	-103%	6060	-1090%	9	58	50 - 125	30
Benzo(k)fluoranthene	6470	914%	4360	-2720%	39	58	50 - 125	30
Chrysene/Triphenylene	15000	-230%	12800	-2750%	16	87.1	50 - 125	30
Fluoranthene	28100	-5000%	24300	-11500%	15	58	50 - 125	30
Fluorene	6250	1170%	4900	-1150%	24	58	50 - 125	30
Indeno(1,2,3-cd)pyrene	5610	69%	5000	-983%	11	58	50 - 125	30
Naphthalene	4340	552%	3470	-948%	22	58	50 - 125	30
Perylene	2280	224%	1960	-328%	15	58	50 - 125	30
Phenanthrene	26700	-3280%	21500	-12200%	22	58	50 - 125	30
Pyrene	29000	-5860%	25000	-12800%	15	58	50 - 125	30

Table 3-11. Alkylated PAH MS/MSD Recoveries Sample 030211016

Analyte	Sample ID: 030211016					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
Acenaphthene	1870	-3500%	3390	412%	58	38.8	50 - 125	30
Acenaphthylene	1680	-1340%	1850	-902%	10	38.8	50 - 125	30
Anthracene	4330	-10700%	7510	-2500%	54	38.8	50 - 125	30
Benzo(a)anthracene	10200	-17000%	15900	-2320%	44	38.8	50 - 125	30
Benzo(a)pyrene	9320	-14400%	14800	-258%	45	38.8	50 - 125	30
Benzo(a,b)fluoranthene	11500	-10900%	21200	9870%	59	46.6	50 - 125	30
Benzo(e)pyrene	6820	-10300%	10400	-1030%	42	38.8	50 - 125	30
Benzo(g,h,i)perylene	6160	-9020%	8900	-1960%	36	38.8	50 - 125	30
Benzo(k)fluoranthene	6150	-5460%	8240	-77%	29	38.8	50 - 125	30
Fluoranthene	23500	-48200%	37400	-12400%	46	38.8	50 - 125	30
Fluorene	2290	-5880%	4590	52%	67	38.8	50 - 125	30
Indeno(1,2,3-cd)pyrene	5160	-7270%	7460	-1340%	36	38.8	50 - 125	30
Naphthalene	951	-3760%	2120	-747%	76	38.8	50 - 125	30
Perylene	2300	-3610%	3470	-593%	41	38.8	50 - 125	30
Phenanthrene	16200	-41800%	27600	-12400%	52	38.8	50 - 125	30
Pyrene	18500	-41200%	28500	-15400%	43	38.8	50 - 125	30

Table 3-12. Alkylated PAH MS/MSD Recoveries Sample 030211002

Analyte	Sample ID: 030211002					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
Acenaphthene	3450	3910%	3130	3270%	10	49.3	50 - 125	30
Acenaphthylene	1410	1090%	654	-440%	73	49.3	50 - 125	30
Anthracene	9040	11000%	4500	1770%	67	49.3	50 - 125	30
Benzo(a)anthracene	10400	10400%	5270	0%	65	49.3	50 - 125	30
Benzo(a)pyrene	8350	8070%	4410	81%	62	49.3	50 - 125	30
Benzo(a,b)fluoranthene	12100	13200%	6010	2870%	67	59.2	50 - 125	30
Benzo(e)pyrene	5930	5860%	3270	467%	58	49.3	50 - 125	30
Benzo(g,h,i)perylene	4040	3630%	2240	-20%	57	49.3	50 - 125	30
Benzo(k)fluoranthene	4000	3240%	2070	-669%	64	49.3	50 - 125	30
Chrysene/Triphenylene	8770	5920%	5220	1130%	51	74.1	50 - 125	30
Fluoranthene	29100	54600%	17000	30000%	52	49.3	50 - 125	30
Fluorene	6730	9350%	4050	3910%	50	49.3	50 - 125	30
Indeno(1,2,3-cd)pyrene	3640	3610%	1980	243%	59	49.3	50 - 125	30
Naphthalene	6050	10400%	1620	1430%	116	49.3	50 - 125	30
Perylene	2150	2440%	1130	375%	62	49.3	50 - 125	30
Phenanthrene	29500	55300%	14700	25300%	67	49.3	50 - 125	30
Pyrene	21200	37300%	12600	19900%	51	49.3	50 - 125	30

Table 3-13. Alkylated PAH MS/MSD Recoveries Sample 030211031

Analyte	Sample ID: 030911014					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
Acenaphthene	10400	15200%	2300	-209%	128	52.6	50 - 125	30
Acenaphthylene	5280	6710%	2010	494%	90	52.6	50 - 125	30
Anthracene	32200	53300%	4310	266%	153	52.6	50 - 125	30
Benzo(a)anthracene	58500	96300%	8810	1840%	148	52.6	50 - 125	30
Benzo(a)pyrene	58400	96600%	7490	-171%	155	52.6	50 - 125	30
Benzo(a,b)fluoranthene	128000	1890000%	8680	32%	175	63.2	50 - 125	30
Benzo(e)pyrene	33000	52100%	5400	-399%	144	52.6	50 - 125	30
Benzo(g,h,i)perylene	23200	35000%	4170	-1220%	139	52.6	50 - 125	30
Benzo(k)fluoranthene	31800	52900%	4490	989%	151	52.6	50 - 125	30
Chrysene/Triphenylene	48800	51100%	7590	-884%	146	79.2	50 - 125	30
Fluoranthene	131000	209000%	20800	-570%	145	52.6	50 - 125	30
Fluorene	20800	33000%	3600	285%	141	52.6	50 - 125	30
Indeno(1,2,3-cd)pyrene	21200	33000%	3520	-856%	143	52.6	50 - 125	30
Naphthalene	7920	4940%	3800	-2890%	70	52.6	50 - 125	30
Perylene	11200	18100%	1650	-57%	149	52.6	50 - 125	30
Phenanthrene	110000	175000%	16200	-3230%	149	52.6	50 - 125	30
Pyrene	82600	122000%	16300	-4370%	134	52.6	50 - 125	30

Table 3-14. Alkylated PAH MS/MSD Recoveries Sample 030811006

Analyte	Sample ID: 030811006					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
Acenaphthene	3090	5450%	670	-110%	129	43.5	50 - 125	30
Acenaphthylene	790	1370%	305	257%	89	43.5	50 - 125	30
Anthracene	6340	10600%	1360	-851%	129	43.5	50 - 125	30
Benzo(a)anthracene	14100	22200%	3740	-1630%	116	43.5	50 - 125	30
Benzo(a)pyrene	13800	23600%	3270	-598%	123	43.5	50 - 125	30
Benzo(a,b)fluoranthene	23000	35900%	3840	-805%	143	52.2	50 - 125	30
Benzo(e)pyrene	9790	16300%	2570	-276%	117	43.5	50 - 125	30
Benzo(g,h,i)perylene	9070	15400%	2410	138%	116	43.5	50 - 125	30
Benzo(k)fluoranthene	7750	11900%	2300	-621%	108	43.5	50 - 125	30
Chrysene/Triphenylene	15200	16800%	3540	-1100%	124	65.3	50 - 125	30
Fluoranthene	42200	71700%	9490	-3470%	127	43.5	50 - 125	30
Fluorene	3820	6700%	729	-405%	136	43.5	50 - 125	30
Indeno(1,2,3-cd)pyrene	7490	12700%	1940	-23%	118	43.5	50 - 125	30
Naphthalene	3090	6260%	266	-232%	168	43.5	50 - 125	30
Perylene	3250	5430%	886	-2%	114	43.5	50 - 125	30
Phenanthrene	34500	61400%	6560	-2870%	136	43.5	50 - 125	30
Pyrene	34000	57300%	7750	-3080%	126	43.5	50 - 125	30

Table 3-15. Alkylated PAH MS/MSD Recoveries Sample 030911005

Analyte	Sample ID: 030911005					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
Acenaphthene	1490	-38400%	2700	-35700%	58	44.3	50 - 125	30
Acenaphthylene	1100	-1670%	2370	1200%	73	44.3	50 - 125	30
Anthracene	4690	-101000%	7970	-93700%	52	44.3	50 - 125	30
Benzo(a)anthracene	11300	-125000%	18600	-109000%	49	44.3	50 - 125	30
Benzo(a)pyrene	10100	-88900%	17200	-72900%	52	44.3	50 - 125	30
Benzo(a,b)fluoranthene	14400	-82700%	34700	-44400%	83	53.1	50 - 125	30
Benzo(e)pyrene	7290	-65500%	12600	-53500%	53	44.3	50 - 125	30
Benzo(g,h,i)perylene	5870	-57600%	9330	-49800%	46	44.3	50 - 125	30
Benzo(k)fluoranthene	5930	-45500%	7570	-41800%	24	44.3	50 - 125	30
Chrysene/Triphenylene	11700	-67200%	17300	-58700%	39	66.4	50 - 125	30
Fluoranthene	28600	-342000%	51300	-291000%	57	44.3	50 - 125	30
Fluorene	2340	-53000%	3980	-49300%	52	44.3	50 - 125	30
Indeno(1,2,3-cd)pyrene	4970	-46600%	7990	-39800%	47	44.3	50 - 125	30
Naphthalene	770	-27800%	1340	-26500%	54	44.3	50 - 125	30
Perylene	2390	-24600%	4120	-20700%	53	44.3	50 - 125	30
Phenanthrene	19500	-365000%	33800	-332000%	54	44.3	50 - 125	30
Pyrene	21300	-286000%	36400	-252000%	52	44.3	50 - 125	30

Table 3-16. Alkylated PAH Laboratory Control Sample Recoveries

Analyte	Spike Amount (µg/Kg)	QC Batch: 164715		QC Batch: 164850		QC Batch: 164939		Acceptance Limits (% Recovery)
		Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	
Acenaphthene	25	19.4	78%	21.5	86%	21.0	84%	50 - 125
Acenaphthylene	25	22.2	89%	23.8	95%	22.3	89%	50 - 125
Anthracene	25	22.1	88%	25.2	101%	25.4	102%	50 - 125
Benzo(a)anthracene	25	24.0	96%	24.8	99%	24.3	97%	50 - 125
Benzo(a)pyrene	25	22.5	90%	24.4	98%	23.9	96%	50 - 125
Benzo(a,b)fluoranthene	30	36.4	121%	33.4	111%	32.9	110%	50 - 125
Benzo(e)pyrene	25	27.9	112%	26.2	105%	26.4	106%	50 - 125
Benzo(g,h,i)perylene	25	26.5	106%	24.0	96%	23.3	93%	50 - 125
Benzo(k)fluoranthene	25	23.1	92%	23.3	93%	24.0	96%	50 - 125
Chrysene/Triphenylene	37.5	31.1	83%	36.1	96%	35.9	96%	50 - 125
Dibenz(a,h)anthracene	25	26.2	105%	36.1	144%	23.4	94%	50 - 125
Fluoranthene	25	25.1	100%	24.3	97%	27.0	108%	50 - 125
Fluorene	25	21.4	86%	27.1	108%	23.3	93%	50 - 125
Indeno(1,2,3-cd)pyrene	25	26.2	105%	24.3	97%	22.5	90%	50 - 125
Naphthalene	25	18.4	74%	23.6	94%	17.5	70%	50 - 125
Perylene	25	15.6	62%	19.2	77%	22.2	89%	50 - 125
Phenanthrene	25	21.8	87%	22.4	90%	23.9	96%	50 - 125
Pyrene	25	24.7	99%	23.3	93%	26.5	106%	50 - 125

Table 3-17. Alkylated PAH Laboratory Control Sample Recoveries, cont.

Analyte	Spike Amount (µg/Kg)	QC Batch: 165033		QC Batch: 165092		QC Batch: 165321		Acceptance Limits (% Recovery)
		Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	
Acenaphthene	25	19.7	79%	20.7	83%	18.4	74%	50 - 125
Acenaphthylene	25	21.3	85%	22.1	88%	19.9	80%	50 - 125
Anthracene	25	23.5	94%	23.3	93%	24.1	96%	50 - 125
Benzo(a)anthracene	25	24.3	97%	24.1	96%	21.1	84%	50 - 125
Benzo(a)pyrene	25	22.2	89%	21.6	86%	22.1	88%	50 - 125
Benzo(a,b)fluoranthene	30	31.5	105%	30.2	101%	26.1	87%	50 - 125
Benzo(e)pyrene	25	24.0	96%	23.1	92%	23.3	93%	50 - 125
Benzo(g,h,i)perylene	25	21.5	86%	21.6	86%	22.7	91%	50 - 125
Benzo(k)fluoranthene	25	21.0	84%	20.0	80%	23.4	94%	50 - 125
Chrysene/Triphenylene	37.5	32.1	86%	29.9	80%	33.3	89%	50 - 125
Dibenz(a,h)anthracene	25	22.9	92%	22.4	90%	22.6	90%	50 - 125
Fluoranthene	25	24.4	98%	23.5	94%	24.2	97%	50 - 125
Fluorene	25	21.6	86%	22.0	88%	20.5	82%	50 - 125
Indeno(1,2,3-cd)pyrene	25	22.0	88%	21.8	87%	22.3	89%	50 - 125
Naphthalene	25	19.0	76%	19.5	78%	13.7	55%	50 - 125
Perylene	25	20.5	82%	20.5	82%	20.7	83%	50 - 125
Phenanthrene	25	21.6	86%	20.7	83%	21.2	85%	50 - 125
Pyrene	25	24.9	100%	23.8	95%	24.2	97%	50 - 125

Table 3-18. Alkylated PAH Field Duplicate Analytical Results Summary

Analyte	Sample ID: 030211007 Result (µg/Kg)	Sample ID: 030211008 Result (µg/Kg)	RPD	Sample ID: 030211012 Result (µg/Kg)	Sample ID: 030211013 Result (µg/Kg)	RPD
Acenaphthene	2920	4820	49	4310	5090	17
Acenaphthylene	2200	3210	37	7100	7250	2
Anthracene	8380	9830	16	11000	10800	2
Benzo(a)anthracene	19600	20400	4	17600	17600	0
Benzo(a)pyrene	16000	17600	10	14700	13700	7
Benzo(a,b)fluoranthene	19200	19800	3	14200	12200	15
Benzo(e)pyrene	10300	11700	13	9590	9350	3
Benzo(g,h,i)perylene	8250	9550	15	6960	7960	13
Benzo(k)fluoranthene	6770	9430	33	5510	8680	45
C1-Chrysenes	13800	16300	17	24900	21900	13
C1-Fluoranthenes/Pyrenes	49300	60900	21	90500	84100	7
C1-Fluorenes	7950	12700	46	16000	15100	6
C1-Naphthalenes	2480	7710	103	9480	8010	17
C1-Phenanthrenes/Anthracenes	32200	45300	34	85100	84100	1
C2-Chrysenes	7700	9510	21	14500	11900	20
C2-Fluorenes	6050	9020	39	15100	10100	39.7
C2-Naphthalenes	4650	9650	70	21000	19700	6
C2-Phenanthrenes/Anthracenes	7990	11700	37.7	25800	24600	4.8
C3-Chrysenes	4440	6020	30.2	8080	9640	17.6
C3-Fluorenes	3040	4670	42.3	6210	7250	15.5
C3-Naphthalenes	6630	10400	44.3	21400	20000	6.8

Analyte	Sample ID: 030211007 Result (µg/Kg)	Sample ID: 030211008 Result (µg/Kg)	RPD	Sample ID: 030211012 Result (µg/Kg)	Sample ID: 030211013 Result (µg/Kg)	RPD
C3-Phenanthrenes/Anthracenes	6910	9770	34.3	15800	14300	10.0
C4-Chrysenes	2030	2220	8.9	2540	2880	12.5
C4-Naphthalenes	2720	3800	33.1	5730	6500	12.6
C4-Phenanthrenes/Anthracenes	10600	12700	18.0	15200	14300	6.1
Dibenz(a,h)anthracene	548 U	569 U	3.8	471 U	448 U	5.0
Fluoranthene	45300	52500	14.7	32600	32100	1.5
Fluorene	4520	7180	45.5	5460	6420	16.2
Indeno(1,2,3-cd)pyrene	7060	8190	14.8	5830	6760	14.8
Naphthalene	1510	5920	118.7	2410	2850	17
Perylene	3160	3530	11.1	2490	2950	16.9
Phenanthrene	33300	44700	29.2	30200	31000	2.6
Pyrene	35600	43400	19.7	35600	34300	3.7

Table 3-19. Alkylated PAH Field Duplicate Analytical Results Summary, cont.

Analyte	Sample ID: 030211023	Sample ID: 030211024	RPD	Sample ID: 030211031	Sample ID: 030211034	RPD
	Result (µg/Kg)	Result (µg/Kg)		Result (µg/Kg)	Result (µg/Kg)	
Acenaphthene	1940	2360	20	5050 M1	8250	48
Acenaphthylene	1960	1890	4	7140 M1	10000	33
Anthracene	4440	5080	13	10300 M1	20000	64
Benzo(a)anthracene	9240	9450	2	16200 M1	29500	58
Benzo(a)pyrene	9140	8220	11	12800 M1	24300	62
Benzo(a,b)fluoranthene	8200	7820	5	12000 M1	24000	67
Benzo(e)pyrene	6270	5880	6	8960 M1	17300	64
Benzo(g,h,i)perylene	4870	4330	12	6690 M1	9600	36
Benzo(k)fluoranthene	4680	4730	1	5940 M1	8690	38
C1-Chrysenes	8030	8300	3	22500	43300	63
C1-Fluoranthenes/Pyrenes	28800	30400	5	103000	134000	26
C1-Fluorenes	4370	4770	9	16100	51100	104
C1-Naphthalenes	2440	2940	19	17400	33200	62
C1-Phenanthrenes/Anthracenes	30500	35500	15	103000	135000	27
C2-Chrysenes	5020	5370	7	14100	28100	66
C2-Fluorenes	8540	9390	9	13300	30000	77
C2-Naphthalenes	4060	4880	18	35400	69900	66
C2-Phenanthrenes/Anthracenes	7360	8470	14	25100	49200	64.9
C3-Chrysenes	2990	3380	12	8680	15500	56
C3-Fluorenes	2160	2590	18.1	6710	12400	59.5
C3-Naphthalenes	5480	6610	18.7	34700	68300	65.2
C3-Phenanthrenes/Anthracenes	9010	10300	13.4	17400	33000	61.9

Analyte	Sample ID: 030211023 Result (µg/Kg)	Sample ID: 030211024 Result (µg/Kg)	RPD	Sample ID: 030211031 Result (µg/Kg)	Sample ID: 030211034 Result (µg/Kg)	RPD
C4-Chrysenes	1020	951	7.0	2290	3410	39.3
C4-Naphthalenes	2370	2920	20.8	8560	18300	72.5
C4-Phenanthrenes/Anthracenes	5980	6290	5.1	11400	24800	74.0
Dibenz(a,h)anthracene	498 U	503 U	0	578 U, M1	559 U	0
Fluoranthene	18700	20400	8.7	31000 M1	56900	58.9
Fluorene	2090	2350	11.7	5570 M1	9110	48.2
Indeno(1,2,3-cd)pyrene	3750	3350	11.3	5570 M1	8500	41.6
Naphthalene	1640	1960	17.8	4020 M1	7500	60.4
Perylene	1690	1540	9.3	2150 M1	4030	60.8
Phenanthrene	14000	16100	14.0	28600 M1	54700	62.7
Pyrene	19400	21200	8.9	32400 M1	60300	60.2

Table 3-20. Alkylated PAH Field Duplicate Analytical Results Summary, cont.

Analyte	Sample ID: 030311006	Sample ID: 030311008	RPD	Sample ID: 030811004	Sample ID: 030811005	RPD
	Result (µg/Kg)	Result (µg/Kg)		Result (µg/Kg)	Result (µg/Kg)	
Acenaphthene	2750	4940	57	1150	636	58
Acenaphthylene	1890	3980	71	503	613	20
Anthracene	7040	12400	55	2620	2320	12
Benzo(a)anthracene	13800	21000	41	7960	4600	54
Benzo(a)pyrene	11900	15700	28	6700	3550	61
Benzo(a,b)fluoranthene	12600	16700	28	9230	4060	78
Benzo(e)pyrene	6490	10400	46	6290	2650	81
Benzo(g,h,i)perylene	5000	7850	44	6320	2350	92
Benzo(k)fluoranthene	4180	6580	45	3540	2290	43
C1-Chrysenes	8790	14400	48	4060	2680	41
C1-Fluoranthenes/Pyrenes	36900	52900	36	13000	8300	44
C1-Fluorenes	7060	12200	53	3290	2690	20
C1-Naphthalenes	2420	4990	69	688	713	4
C1-Phenanthrenes/Anthracenes	29900	43500	37	7680	6560	16
C2-Chrysenes	4850	8680	57	2060	1480	33
C2-Fluorenes	4840	9190	62	1240	1100	12
C2-Naphthalenes	4200	8670	69	960	973	1
C2-Phenanthrenes/Anthracenes	6500	10900	51	1580	1330	17.2
C3-Chrysenes	2710	4970	59	1060	801	28
C3-Fluorenes	2240	4150	59.8	943	709	28.3
C3-Naphthalenes	5290	9300	55.0	984	935	5.1
C3-Phenanthrenes/Anthracenes	4360	8070	59.7	1050	879	17.7

Analyte	Sample ID: 030311006 Result (µg/Kg)	Sample ID: 030311008 Result (µg/Kg)	RPD	Sample ID: 030811004 Result (µg/Kg)	Sample ID: 030811005 Result (µg/Kg)	RPD
C4-Chrysenes	1100	1920	54.3	887	421 J	71.3
C4-Naphthalenes	1750	3330	62.2	407 J	372 J	9.0
C4-Phenanthrenes/Anthracenes	7450	13000	54.3	4460	2430	58.9
Chrysene/Triphenylene	10300	17000	49.1	8200	4200	64.5
Dibenz(a,h)anthracene	396 U	398 U	0	497 U	481 U	0
Fluoranthene	34500	49900	36.5	19700	11500	52.6
Fluorene	4080	8020	65.1	1400	1080	25.8
Indeno(1,2,3-cd)pyrene	4370	7050	46.9	4850	1960	84.9
Naphthalene	1900	3200	51.0	476 J	560	16.2
Perylene	2230	3670	48.8	1830	817	76.5
Phenanthrene	29800	46100	43.0	14400	9430	41.7
Pyrene	29300	41300	34.0	16500	9410	54.7

Table 3-21. Alkylated PAH Field Duplicate Analytical Results Summary, cont.

Analyte	Sample ID: 030911006 Result (µg/Kg)	Sample ID: 030911007 Result (µg/Kg)	RPD	Sample ID: 030911014 Result (µg/Kg)	Sample ID: 030911015 Result (µg/Kg)	RPD
Acenaphthene	972	1110	13.3	2410	1470	48
Acenaphthylene	724	1170	47.1	1750	1750	0
Anthracene	2610	3150	18.8	4170	3290	24
Benzo(a)anthracene	5720	7170	22.5	7840	7130	9
Benzo(a)pyrene	4930	7080	35.8	7580	6560	14
Benzo(a,b)fluoranthene	6460	7630	16.6	8660	6750	25
Benzo(e)pyrene	3850	5580	36.7	5610	4700	18
Benzo(g,h,i)perylene	2610	3550	30.5	4810	3640	28
Benzo(k)fluoranthene	2630	4830	59.0	3970	4030	2
C1-Chrysenes	3760	5310	34.2	6290	6050	4
C1-Fluoranthenes/Pyrenes	11900	15900	28.8	21300	20000	6
C1-Fluorenes	3090	3720	18.5	5940	4410	30
C1-Naphthalenes	870	1050	18.8	5630	2850	66
C1-Phenanthrenes/Anthracenes	7750	9330	18.5	15500	13800	12
C2-Chrysenes	3070	3880	23.3	3920	3900	1
C2-Fluorenes	2060	2480	18.5	3610	3520	3
C2-Naphthalenes	1480	1840	21.7	5280	3590	38
C2-Phenanthrenes/Anthracenes	2270	2880	23.7	4500	4690	4.1
C3-Chrysenes	2800	3260	15.2	2220	2320	4
C3-Fluorenes	1010	1540	41.6	1880	1690	10.6
C3-Naphthalenes	1910	2160	12.3	4470	4250	5.0
C3-Phenanthrenes/Anthracenes	2110	2590	20.4	3730	3860	3.4

Analyte	Sample ID: 030911006 Result (µg/Kg)	Sample ID: 030911007 Result (µg/Kg)	RPD	Sample ID: 030911014 Result (µg/Kg)	Sample ID: 030911015 Result (µg/Kg)	RPD
C4-Chrysenes	771	890	14.3	1030	795	25.8
C4-Naphthalenes	779	901	14.5	1510	1650	8.9
C4-Phenanthrenes/Anthracenes	3680	4690	24.1	5740	5020	13.4
Chrysene/Triphenylene	5540	7650	32.0	8290	6910	18.2
Dibenz(a,h)anthracene	440 U	392 U	0	424 U	365 U	0
Fluoranthene	14000	17600	22.8	21100	15100	33.1
Fluorene	1640	1890	14.2	3450	1900	57.9
Indeno(1,2,3-cd)pyrene	2280	3140	31.7	3970	3160	22.7
Naphthalene	569	694	19.8	5320	2790	62.4
Perylene	1180	1690	35.5	1680	1420	16.8
Phenanthrene	9770	11500	16.3	17900	9480	61.5
Pyrene	11700	14800	23.4	18600	13700	30.3

3.3 SW-846 Method 8270C–Phenols

3.3.1 Summary

SW-846 Method 8270C employs gas chromatographic separation with mass spectroscopic identification for the phenolic compounds of interest.

3.3.2 Method Blanks

The samples were prepared in three different preparation batches. None of the method blanks associated with these sample analyses showed any contamination for any of the target compounds above the detection limit.

No data are qualified due to the blank contamination.

The results for the three method blanks are summarized in Table 3-22.

3.3.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. All reported DFTPP tunes passed the established criteria. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all target analyte results.

All of the initial calibration verification (ICV) and continuing calibration verification (CCV) checks for Method 8270C performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes.

No data are qualified as a consequence of the calibration data.

3.3.4 Surrogate Compound Recoveries

Six surrogate compounds were spiked into each of the samples. However, since the compounds of interest for the current investigation are selected phenolic compounds, only the acid surrogates are considered as part of the validation process. Hence only values for 2,4,6-tribromophenol, phenol-*d*₅, and 2-fluorophenol are considered here.

None of the acid surrogate compounds recovered outside of the laboratory's limits for any of the samples in these three SDGs. No data are qualified as a result of surrogate recoveries data.

The surrogate recoveries for all samples are presented in Table 3-23.

3.3.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on two of the samples.

All of the target analytes for all of the MS/MSD analyses samples recovered within the limits used by the laboratory. Based upon the acceptable recoveries, there is no need to qualify data based upon the MS/MSD recoveries.

The matrix spike/matrix spike duplicate results are summarized in Tables 3-24 and 3-25.

3.3.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. All of the target analytes for all of the laboratory control samples recovered within the limits used by the laboratory. Based upon the acceptable recoveries, there is no need to qualify data based upon the LCS recovery results.

The laboratory control sample results are given in Table 3-26.

3.3.7 Field Duplicates

Field duplicates show excellent agreement for all of the analytes. Calculated RPD values are all < 50%. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate “NDs”, however, are reported with 0% RPDs.

The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for semivolatiles analyses.

Based upon these observations, no results for any field samples associated with these duplicate pairs are qualified based upon field duplicate data.

The results of the duplicate analyses are given in Table 3-27.

Table 3-12. Phenols Method Blank Analytical Results Summary

Analyte	QC Batch: 56576	QC Batch: 56797	QC Batch: 63006	LOD	LOQ
	Result (µg/Kg)	Result (µg/Kg)	Result (µg/Kg)		
2,4-Dimethylphenol	167 U	167 U	167 U	83.3	167
2-Methylphenol(<i>o</i> -Cresol)	167 U	167 U	167 U	83.3	167
3&4-Methylphenol(<i>m&p</i> Cresol)	167 U	167 U	167 U	17.4	167
Phenol	167 U	167 U	167 U	19.8	167

Table 3-23. Surrogate Compound Recovery Data for Phenols

Lab SDG	Field ID	2,4,6-Tribromophenol 10 - 130	2-Fluorophenol 26 - 130	Phenol- <i>d</i> ₅ 31 - 130
4043076001	030211001	78	75	82
4043076004	030211007	79	60	64
4043076005	030211008	79	65	68
4043076009	030211014	80	67	68
4043076015	030211026	72	52	61
4043076021	030311001	68	62	65
4043262001	030811001	78	75	81
4043262002	030811002	89	78	80
4043262003	030811003	94	73	86
4043262004	030811004	71	69	73
4043262005	030811005	77	75	89
4043262006	030811006	74	61	69
4043262007	030811007	86	65	67
4043262008	030811008	102	55	71
4043262009	030911001	73	68	84
4043262010	030911002	59	65	77
4043262011	030911003	61	64	71
4043262012	030911004	61	66	75
4043262013	030911005	82	55	64
4043262014	030911006	52	67	79
4043262015	030911007	53	68	80
4043262016	030911008	58	70	85
4043262017	030911009	51	68	79
4043262018	030911010	77	84	87
4043262019	030911011	48	60	76
4043262020	030911012	77	49	54
4043262021	030911013	81	58	65
4043262022	030911014	84	70	79
4043262023	030911015	89	71	73
4043262024	030911016	92	66	76
4043262025	030911017	80	78	93
4043262026	030911018	67	66	70
4043262027	030911019	48	67	79

Table 3-24. Phenols MS/MSD Recoveries Sample ID: 030811006

Analyte	Sample ID: 030811006					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
2,4-Dimethylphenol	18500	106%	19300	111%	4	17400	30 - 130	32
2-Methylphenol(<i>o</i> -Cresol)	15900	91%	14500	83%	9	17400	45 - 130	26
3&4-Methylphenol(<i>m&p</i> Cresol)	16600	95%	15400	89%	8	17400	43 - 130	25
Phenol	15600	90%	14900	86%	5	17400	41 - 130	28

Table 3-25. Phenols MS/MSD Recoveries Sample ID: 030911005

Analyte	Sample ID: 030911005					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	RPD			
2,4-Dimethylphenol	17000	96%	15400	87%	10	17700	30 - 130	32
2-Methylphenol(<i>o</i> -Cresol)	13500	76%	12000	68%	12	17700	45 - 130	26
3&4-Methylphenol(<i>m&p</i> Cresol)	17800	75%	15400	61%	14	17700	43 - 130	25
Phenol	13000	73%	11700	66%	11	17700	41 - 130	28

Table 3-26. Phenols Laboratory Control Sample Recoveries

Analyte	QC Batch: 67332		QC Batch: 67568		QC Batch: 67698		Acceptance Limits (% Recovery)
	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	Amount Recovered (µg/Kg)	Percent Recovery	
2,4-Dimethylphenol	1670	1270	76%	1440	86%	1380	50 - 130
2-Methylphenol (<i>o</i> -Cresol)	1670	1010	60%	1420	85%	1400	51 - 130
3&4-Methylphenol (<i>m&p</i> -Cresol)	1670	1020	61%	1450	87%	1430	53 - 130
Phenol	1670	1120	67%	1460	87%	1490	46 - 130

Table 3-27. Phenols Field Duplicates

Analyte	Sample ID: 030211007 Result (µg/Kg)	Sample ID: 030211008 Result (µg/Kg)	RPD	Sample ID: 030811004 Result (µg/Kg)	Sample ID: 030811005 Result (µg/Kg)	RPD
2,4-Dimethylphenol	2200 U	11400 U	0.0	2500 U	2420 U	0.0
2-Methylphenol(<i>o</i> -Cresol)	2200 U	11400 U	0.0	2500 U	2420 U	0.0
3&4-Methylphenol(<i>m&p</i> Cresol)	2200 U	11400 U	0.0	308 J	2420 U	NC
Phenol	2200 U	11400 U	0.0	2500 U	2420 U	0.0

Table 3-27. Phenols Field Duplicates, cont.

Analyte	Sample ID: 030911006 Result (µg/Kg)	Sample ID: 030911007 Result (µg/Kg)	RPD	Sample ID: 030911014 Result (µg/Kg)	Sample ID: 030911015 Result (µg/Kg)	RPD
2,4-Dimethylphenol	2210 U	3940 U	0.0	4250 U	1840 U	0.0
2-Methylphenol(<i>o</i> -Cresol)	2210 U	3940 U	0.0	4250 U	1840 U	0.0
3&4-Methylphenol(<i>m&p</i> Cresol)	767 J	3940 U	NC	807 J	514 J	44.4
Phenol	2210 U	3940 U	0.0	4250 U	1840 U	0.0

3.4 SW-846 Method 8015B – Total Petroleum Hydrocarbons (TPH)

3.4.1 Summary

SW-846 Method 8015B employs gas chromatographic separation with a flame ionization detector (FID). Samples are first prepared for analysis using SW-846 Method 3546, Microwave Extraction.

3.4.2 Method Blanks

The samples were prepared in three different preparation batches, one for the diesel range organics (C10-C28) and two for the gasoline range organics (C5-C12). None of the method blanks associated with these sample analyses showed any contamination for either of the fuel ranges above the reporting limit

No data are qualified due to the blank contamination.

The results for the three method blanks are summarized in Table 3-28.

3.4.3 Calibration

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <20% RSD. Therefore an average response factor calibration model was used to quantitate all target analyte results.

All of the initial calibration verification (ICV) and continuing calibration verification (CCV) checks for Method 8015B performed gave acceptable results (i.e., <15%D according SW-846 Method 8000B) for all of the target analytes.

No data are qualified as a consequence of the calibration data.

3.4.4 Surrogate Compound Recoveries

The compound *o*-terphenyl was spiked into each of the samples as a surrogate compound to monitor method performance.

Most of the samples required dilutions such that the surrogate compound was diluted out. For those that did not require the higher dilutions, all of the recoveries were within the acceptance limits. No data are qualified as a result of surrogate recoveries data.

The surrogate recoveries for all samples are presented in Table 3-29. Values outside of the acceptance limits are shown in ***bold italic shaded*** font.

3.4.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on sample 030811006.

The recovery for the gasoline range (C5-C12) was within the laboratory's limits. Both the MS and MSD recoveries for the diesel range of the fuel components were well above the laboratory's recovery limits (%recovery >200%).

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. When viewed with the Laboratory Control Sample data discussed below and recognizing that the non-specific nature of an FID detector, no data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The matrix spike/matrix spike duplicate results are summarized in Table 3-30. Values outside of the acceptance limits are displayed in ***bold italic shaded*** font.

3.4.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples.

All of the target analytes for all of the laboratory control samples recovered within the limits used by the laboratory. Based upon the acceptable recoveries, there is no need to qualify data based upon the LCS recovery results.

The laboratory control sample results are given in Table 3-31.

3.4.7 Field Duplicates

Field duplicates show excellent agreement for all of the analytes with RPD <50% . Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate "NDs", however, are reported with 0% RPDs.

The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for semivolatiles analyses.

Based upon these observations, no results for any field samples associated with these duplicate pairs are qualified based upon field duplicate data.

The results of the duplicate analyses are given in Table 3-32.

Table 3-28. TPH Method Blank Analytical Results Summary

Analyte	QC Batch: 67184	QC Batch: 67507	QC Batch: 67567	LOD	LOQ
	Result (mg/Kg)	Result (mg/Kg)	Result (mg/Kg)		
TPH (C5-C12)	10.0 U	10.0 U	NR	4.0	10.0
TPH - Diesel (C10-C28)	NR	NR	1.7 U	0.60	1.7

Table 3-29. TPH Surrogate Compound Recoveries

Lab SDG	Field ID	o- Terphenyl 48 - 179	
4043076009	030211014	0	S4
4043076015	030211026	0	S4
4043262002	030811002	0	S4
4043262004	030811004	0	S4
4043262005	030811005	113	
4043262006	030811006	146	
4043262009	030911001	0	S4
4043262017	030911009	144	
4043262018	030911010	116	
4043262019	030911011	0	S4
4043262021	030911013	0	S4

*S4= Flag applied by the laboratory to indicate surrogate recovery outside laboratory control limits due to dilution

Table 3-30. TPH MS/MSD Recoveries Sample ID: 030811006

Analyte	Sample ID: 030811006					Spike Amount	Accuracy Limits (%)	RPD Limits (%)
	Amount Recovered (mg/kg)	Percent Recovery	Amount Recovered (mg/kg)	Percent Recovery	RPD			
TPH (C5-C12)	71.5	67%	68.8	64%	4	91.5	66 - 120	20
TPH - Diesel (C10-C28)	1020	206%	1290	284%	23	348	10 - 164	20

Table 3-31. TPH Laboratory Control Sample Recoveries

Analyte	Spike Amount (mg/kg)	QC Batch: 67184		QC Batch: 67507		QC Batch: 67567		Acceptance Limits (% Recovery)
		Amount Recovered (mg/kg)	Percent Recovery	Amount Recovered (mg/kg)	Percent Recovery	Amount Recovered (mg/kg)	Percent Recovery	
TPH (C05-C12)	50	50.2	100%	51.9	104%	NR	NC	80 - 125
TPH - Diesel (C10-C28)	33.3	NR	NC	NR	NC	29.6	89%	52 - 130

Table 3-32. TPH Field Duplicate Results

Analyte	Sample ID: 030811004	Sample ID: 030811005	RPD
	Result (mg/kg)	Result (mg/kg)	
TPH (C05-C12)	24.9 U	24.2 U	0
TPH - Diesel (C10-C28)	1070	665	46.7

Data Validation Report
2069 NORTH BRANCH
(Division Street Former MGP Site
and Willow Street / Hawthorne Avenue Station OU)

Surface Water Sample Analyses Performed by

Pace Analytical, Green Bay
and
TestAmerica, Pittsburgh

Prepared for



Prepared by

SHEPHERD TECHNICAL SERVICES

July 27, 2012

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1.0 INTRODUCTION

All data validation was performed by Dr. Michael Shepherd (Ph.D. Chemistry), following US EPA National Functional Guidelines. Sample analyses were performed by Pace Analytical Services, Inc., Green Bay, WI and TestAmerica Laboratories, Inc., Pittsburgh, PA.

Pace Analytical Services, Inc., Green Bay, WI performed the analyses for metals, phenols, PAHs, and PVOCs on the groundwater samples. The Pace Green Bay laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200050). The Pace laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Florida Department of Health Laboratory Accreditation Program (ID #E87948).

Analyses for Available Cyanide were performed by the TestAmerica Pittsburgh laboratory. TestAmerica Pittsburgh maintains accreditation under the National Environmental Laboratory Accreditation Program (NELAP) by the Pennsylvania Department of Environmental Protection Laboratory Accreditation Program (Certificate Number 008, ID#2-00416) as well as the Illinois EPA Environmental Laboratory Accreditation Program (IEPA ELAP #200005).

Both laboratories provided all analytical data, including all internal laboratory QC results in an electronic data deliverable (EDD) format. These EDDs were used to perform the validation.

Nineteen surface water samples which included two field duplicates and one equipment blank were collected between 12 December 2011 and 14 December 2011 at the North Branch Division and Willow/Hawthorne sites. All samples were delivered overnight to the laboratories. Samples were organized into one sample delivery group (SDG or laboratory lot number) for the analyses by the Pace laboratory and one SDG by the TestAmerica laboratory. The samples were analyzed for the indicated parameters using the methods listed in Table 1-1.

Table 1-1. Sample/SDG Cross Reference

Field ID	Pace Sample ID	TestAmerica Sample ID	EPA 6020	EPA 6020- Total Hardness	EPA 7470	EPA 8082	EPA 8260	EPA 8270	EPA 8270 by SIM	EPA 1677
121211001	4054806001	180-6882-2	X	X	X	X	X	X	X	X
121211002	4054806002	180-6882-3	X	X	X		X	X	X	X
121211003	4054806003	180-6882-4	X	X	X	X	X	X	X	X
121211004	4054806004	180-6882-5	X	X	X		X	X	X	X
121311001	4054806005	180-6882-6	X	X	X	X	X	X	X	X
121311002	4054806006	180-6882-7	X	X	X	X	X	X	X	X
121311003	4054806007	180-6882-8	X	X	X		X	X	X	X
121311004	4054806008	180-6882-9	X	X	X	X	X	X	X	X
121311005	4054806009	180-6882-10	X	X	X		X	X	X	X
121311006	4054806010	180-6882-11	X	X	X	X	X	X	X	X
121311007	4054806011	180-6882-1	X	X	X	X	X	X	X	X
121311008	4054806012	180-6882-12	X	X	X	X	X	X	X	X
121311009	4054806013	180-6882-13	X	X	X	X	X	X	X	X
121311010	4054806014	180-6882-14	X	X	X		X	X	X	X
121311011	4054806015	180-6882-15				X	X	X	X	X
121411001	4054806016	180-6882-16	X	X	X		X	X	X	X
121411002	4054806017	180-6882-17	X	X	X		X	X	X	X
121411003	4054806018	180-6882-18	X	X	X		X	X	X	X
121411004	4054806019	180-6882-19	X	X	X		X	X	X	X

2.0 INORGANIC DATA REVIEW

2.1 Summary

Blank, spiked, and duplicate results were provided. Overall, QC data indicated acceptable precision and accuracy. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of groundwater or soil samples.

2.2 Sample Receipt and Methodology

The groundwater and soil samples were analyzed for inorganic parameters following the methods cited in the table below.

Table 2-1. Inorganic Analytes and Methods Summary

Analyte	Analytical Method
Metals	SW-846 6020A
Mercury	SW-846 7470A
Available Cyanide	EPA OIA-1677
Hardness	SW-846 6020A/Calculation

The samples arrived at the laboratory properly preserved and in good condition.

All samples were analyzed for metals (including hardness), mercury, and available cyanide within the prescribed holding times.

2.3 Calibration

Initial instrument calibrations for each of the methods were all well within acceptance criteria. All parameters were calibrated using multi-point curves with appropriate first order regression models applied.

All of the initial calibration verification checks (ICVs) for these analyses met the $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the initial calibration verification data.

The laboratory also performed the requisite interference checks (ICS A, ICS AB) with each calibration. All of the interference checks gave acceptable results. Hence, no data are qualified as a consequence of the interference check sample data.

Continuing calibration verification checks were performed at the required frequencies. All of the continuing calibration verification checks (CCVs) for these analyses met the $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the continuing calibration data.

2.4 Blanks

None of the initial and continuing calibration blanks (ICBs/CCBs) for ICP/MS metals gave any values above the limit of detection limit for any of the elements. Therefore, no results for any of the ICP/MS analyses are qualified.

The initial and continuing calibration blanks (ICBs/CCBs) for mercury all gave results below the limit of detection. Therefore, no data are qualified as a consequence of the calibration blank data.

The initial and continuing calibration blanks (ICBs/CCBs) for available cyanide all gave results below the limit of detection. Therefore, no data are qualified as a consequence of the calibration blank data.

Method blanks were prepared for each batch of samples analyzed. The method blanks for metals by ICP/MS, mercury and available cyanide showed no contamination, and hence no data are qualified.

The method blank results are summarized in Tables 2-2, 2-3, 2-4, and 2-5.

2.5 Laboratory Control Samples

Laboratory control samples (LCS) were analyzed with each of the data sets. The recovery limits used by the laboratory for LCS results are either those given in the method guidance or are based upon laboratory performance. All recoveries for all analytes/all methods were within the specified limits. No data are qualified as a consequence of the LCS results.

Recoveries are given along with the acceptance limits in Tables 2-6, 2-7, 2-8, and 2-9.

2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were evaluated for all of the inorganic parameters.

Sample 121311006 was analyzed as matrix spiked/matrix spiked duplicate samples for ICP/MS metals. The recovery for calcium for the hardness determination was above the upper recovery in both the MS/MSD sample. However, the concentration of calcium in the sample far exceeded the spike amount. Therefore the failed recovery is not cause for qualifying sample data. All recoveries for all other analytes were within the specified limits.

Sample 121311006 was analyzed as matrix spiked/matrix spiked duplicate for mercury and available cyanide. All of the results for MS/MSD analyses for mercury and available cyanide were within the specified recovery limits, and hence none of these data are qualified.

The MS/MSD data are given in Tables 2-10 and 2-11.

2.7 ICP Serial Dilutions

Serial dilutions tests were performed for this sample set in accordance with the method requirements.

All RPD values fell within the 10% limit defined by the NFG. Values in excess of 10% RPD occurred only in case (iron) where the sample concentration was <50x the analyte MDL. In these cases the 10% criterion does not apply. Consequently, no data are qualified as consequence of the serial dilution results.

2.8 Field Duplicates

Field duplicates were collected and analyzed for metals, mercury, and available cyanide. Field duplicates generally show excellent agreement for all analytes where the values are above the sample quantitation limit. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate “NDs”, however, are reported with 0% RPDs.

None of the duplicate sample results with both values greater than the limit of quantitation gave RPD values exceeding the 30% limit established by the Multi-Site QAPP. Therefore, no data for any field samples associated with these duplicate pairs are qualified based upon field duplicate data.

The results of the duplicate analyses are given in Tables 2-12, 2-13, 2-14, and 2-15.

Table 2-2. Total Metals Method Blank Results Summary

Analyte	Units	QC Batch: 88206
Aluminum, Dissolved	µg/L	12.0 U
Antimony, Dissolved	µg/L	0.12 U
Arsenic, Dissolved	µg/L	0.19 U
Barium, Dissolved	µg/L	0.14 U
Beryllium, Dissolved	µg/L	0.25 U
Cadmium, Dissolved	µg/L	0.13 U
Chromium, Dissolved	µg/L	0.12 U
Copper, Dissolved	µg/L	0.38 U
Iron, Dissolved	µg/L	10.4 U
Lead, Dissolved	µg/L	0.061 U
Manganese, Dissolved	µg/L	0.32 U
Nickel, Dissolved	µg/L	0.16 U
Selenium, Dissolved	µg/L	0.40 U
Silver, Dissolved	µg/L	0.059 U
Vanadium, Dissolved	µg/L	0.31 U
Zinc, Dissolved	µg/L	4.1 U

Table 2-3. Total Hardness Method Blank Results Summary

Analyte	Units	QC Batch: 88204
Calcium	µg/L	74.1 U
Magnesium	µg/L	8.7 U
Total Hardness	mg/L	0.15 U

Table 2-4. Mercury Method Blank Results Summary

Analyte	Units	QC Batch: 89015
Mercury, Dissolved	µg/L	0.10 U

Table 2-5. Available Cyanide Method Blank Results Summary

Analyte	Units	QC Batch: 180-24015
Available cyanide	mg/L	0.00030 U

Table 2-6. Total Metals Laboratory Control Sample Recoveries

Analyte	Recovery Limits (%)		QC Batch: 88206		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)
Aluminum, Dissolved	80	120	5000	4760	95
Antimony, Dissolved	80	120	500	485	97
Arsenic, Dissolved	80	120	500	508	102
Barium, Dissolved	80	120	500	498	100
Beryllium, Dissolved	80	120	500	513	103
Cadmium, Dissolved	80	120	500	502	100
Chromium, Dissolved	80	120	500	497	99
Copper, Dissolved	80	120	500	491	98
Iron, Dissolved	80	120	5000	4900	98
Lead, Dissolved	80	120	500	492	98
Manganese, Dissolved	80	120	500	494	99
Nickel, Dissolved	80	120	500	493	99
Selenium, Dissolved	80	120	500	513	103
Silver, Dissolved	80	120	250	246	98
Vanadium, Dissolved	80	120	500	482	96
Zinc, Dissolved	80	120	500	508	102

Table 2-7. Total Hardness Laboratory Control Sample Recoveries

Analyte	Recovery Limits (%)		QC Batch: 88204		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)
Calcium	80	120	5000	5070	101
Magnesium	80	120	5000	4970	99

Table 2-8. Mercury Laboratory Control Sample Recoveries

Analyte	Recovery Limits (%)		QC Batch: 89015		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)
Mercury, Dissolved	85	115	5	4.6	92

Table 2-9. Available Cyanide Laboratory Control Sample Recoveries

Analyte	Recovery Limits (%)		QC Batch: 180-24015		
	Lower	Upper	Spike (mg/L)	Result (mg/L)	Recovery (%)
Available cyanide	82	132	0.100	0.103	103

Table 2-10. Total Metals MS/MSD Recoveries

Analyte	MS Sample ID: 121311006			MSD Sample ID: 121311006			RPD	Lab Sample Result
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)		
Aluminum, Dissolved	5000	4680	93	5000	4730	94	1	21.6 J
Antimony, Dissolved	500	485	97	500	483	97	0.5	0.32 J
Arsenic, Dissolved	500	520	104	500	522	104	0.3	0.71 J
Barium, Dissolved	500	519	99	500	524	100	0.9	24.1
Beryllium, Dissolved	500	492	98	500	486	97	1	NR
Cadmium, Dissolved	500	494	99	500	494	99	0	0.13 U
Chromium, Dissolved	500	491	98	500	492	98	0.3	0.38 J
Copper, Dissolved	500	480	95	500	486	96	1	3.3
Iron, Dissolved	5000	4890	96	5000	4960	98	1	69.0 J
Lead, Dissolved	500	501	100	500	501	100	0.02	0.52 J
Manganese, Dissolved	500	499	97	500	506	98	1	15.8
Nickel, Dissolved	500	483	96	500	488	97	1	3.4
Selenium, Dissolved	500	511	102	500	512	102	0.3	0.40 U
Silver, Dissolved	250	236	94	250	236	95	0.3	0.059 U
Vanadium, Dissolved	500	484	97	500	488	97	0.9	0.42 J
Zinc, Dissolved	500	520	100	500	522	101	0.3	17.6

Table 2-11. Other Inorganic MS/MSD Recoveries

Analyte	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)	RPD	Lab Sample Result (µg/L)
Mercury, Dissolved	5	4.4	88	5	4.9	97	10	0.10 U
Available cyanide	0.100	0.0990	99	0.100	0.102	102	3	0.00030 U
Calcium	5000	63100	136	5000	62900	131	0.4	56300 P6
Magnesium	5000	27800	120	5000	27700	117	0.6	21800

Table 2-12. Total Metals Field Duplicates

Analyte	Sample ID: 121311001		Sample ID: 121311002		RPD	Sample ID: 121411001		Sample ID: 121411002		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
Aluminum, Dissolved	12.0	U	12.0	U	0.0	NR		NR		
Antimony, Dissolved	0.32	J	0.32	J	0.0	NR		NR		
Arsenic, Dissolved	0.73	J	0.70	J	4.2	0.71	J	0.64	J	10.4
Barium, Dissolved	23.6		24.4		3.3	23.6		23.2		1.7
Beryllium, Dissolved	NR		NR			0.25	U	0.25	U	0.0
Cadmium, Dissolved	0.13	U	0.13	U	0.0	0.13	U	0.13	U	0.0
Chromium, Dissolved	0.29	J	0.31	J	6.7	0.38	J	0.38	J	0.0
Copper, Dissolved	2.8		2.6		7.4	2.8		3.0		6.9
Iron, Dissolved	40.8	J	42.2	J	3.4	NR		NR		
Lead, Dissolved	0.29	J	0.28	J	3.5	0.69	J	5.5		155.4
Manganese, Dissolved	14.9		15.3		2.6	NR		NR		
Nickel, Dissolved	3.0		2.6		14	2.2		2.6		17
Selenium, Dissolved	0.40	U	0.40	U	0.0	0.40	U	0.40	U	0.0
Silver, Dissolved	0.059	U	0.059	U	0.0	0.059	U	0.059	U	0.0
Vanadium, Dissolved	0.31	U	0.45	J	NC	NR		NR		
Zinc, Dissolved	16.9		16.9		0.0	28.1		28.3		0.7

Table 2-13. Total Hardness Field Duplicates

Analyte	Sample ID: 121311001		Sample ID: 121311002		RPD	Sample ID: 121411001		Sample ID: 121411002		RPD
	Result (mg/L)	Lab Flag	Result (mg/L)	Lab Flag		Result (mg/L)	Lab Flag	Result (mg/L)	Lab Flag	
Total Hardness	237		238		0.4	225		226		0.4
Calcium	58400		58700		0.5	55400		55800		0.7
Magnesium	22200		22100		0.5	21100		21100		0.0

Table 2-14. Mercury Field Duplicates

Analyte	Sample ID: 121311001		Sample ID: 121311002		RPD	Sample ID: 121411001		Sample ID: 121411002		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
Mercury, Dissolved	0.10	U	0.10	U	0.0	0.10	U	0.10	U	0.0

Table 2-15. Available Cyanide Field Duplicates

Analyte	Sample ID: 121311001		Sample ID: 121311002		RPD	Sample ID: 121411001		Sample ID: 121411002		RPD
	Result (mg/L)	Lab Flag	Result (mg/L)	Lab Flag		Result (mg/L)	Lab Flag	Result (mg/L)	Lab Flag	
Available cyanide	ND	U	ND	U	0.0	ND	U	ND	U	0.0

3.0 ORGANIC DATA REVIEW

Blank, spiked, and duplicate results were provided. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples. Organic free water was used as the matrix for aqueous method blank analyses.

Groundwater samples were analyzed for organic compounds following SW-846 Methods as shown in Table 3-1.

Table 3-1. Organic Analytes and Methods Summary

Analyte	Analytical Method
Purgeable Volatile Organic Compounds (PVOC)	SW-846 8260
Polycyclic Aromatic Hydrocarbons (PAH)	SW-846 8270-SIM
Phenols	SW-846 8270
Polychlorinated Biphenyls (PCBs)	SW-846 8082

All samples were received by the laboratory in good condition and intact. Therefore, no data are qualified based upon sample receipt conditions.

All other sample preparations and analyses were performed within the EPA-established holding times.

3.1 SW-846 Method 8260 – Purgeable Volatile Organic Compounds

3.1.1 Summary

SW-846 Method 8260B employs gas chromatographic separation with a mass spectrometer as a detector.

3.1.2 Method Blanks

The samples were analyzed in a single analytical batch. The aqueous method blank for this batch showed no contamination above the detection limit. Hence, no data are qualified as a consequence of the method blank data.

The method blank data are summarized in Table 3-2.

3.1.2 Trip Blanks

Trip blanks were not provided with this sample set. The only target analytes detected in the samples was toluene at levels below the reporting limit. In the absence of trip blanks, determining whether the low level contamination observed in the samples may be associated with contamination during transport may be difficult. Regardless, no data are qualified as a consequence of the absence of trip blank data.

3.1.4 Calibration

All initial calibration criteria were met for all compounds. All analytes fit first order linear regression curves and gave average response factors (RFs) with <15% RSD over the average. Therefore, average RFs were used in sample quantitation. No data are qualified as a result of the initial calibration data.

For evaluating calibration verifications, the June 2008 CLP National Functional Guidelines have established a $\pm 40\%$ drift or difference acceptability criterion for analytes known to exhibit poor response and a $\pm 25\%$ drift or difference criterion for all other target analytes. None of the analytes of concern in this investigation are considered to exhibit poor response. The calibration verification associated with this data set did not exceed the $\pm 25\%$ difference criterion in place for all target analytes. Consequently, no data are qualified as a result of the calibration verification data.

3.1.5 Surrogate Compound Recoveries

Three surrogate compounds, 4-Bromofluorobenzene, Toluene-*d*₈, and Dibromofluoromethane, were spiked into each field sample to monitor analyte recovery in the analytical system. The surrogates used by the laboratory are acceptable to measure recovery under EPA SW-846 guidance for this analytical method. Recoveries for all surrogates for all samples were well within the acceptance limits and are presented in Table 3-3. No data require qualification based upon surrogate recoveries.

3.1.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed for sample 121311006 in this sample set. None of the target compounds recovered outside of the limits established by the laboratory.

No action is defined for flagging data based on the MS/MSD results or RPD values alone. Since all of the reported recoveries were within acceptance limits, no data are qualified as a result of the matrix spike/matrix spike duplicate analyses.

The MS/MSD results are summarized in Tables 3-4.

3.1.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed on each day of analysis and for each analytical batch. None of the analytes recovered outside of the acceptance limits established by the laboratory. No data are qualified due to failed LCS recoveries. The laboratory control sample analyses results are given in Table 3-5.

3.1.8 Field Duplicates

Field duplicates show excellent agreement for all of the analytes. Duplicate “NDs” are reported with 0% RPDs. None of the RPD values exceeded 10% RPD, well below the 30% limit established in the Multi-Site QAPP for this project.

No results for any field samples associated with this duplicate pair are qualified based upon field duplicate data.

The results of the duplicate analyses are given in Table 3-6.

Table 3-2. Method 8260 Method Blank Analytical Results Summary

Analyte	Units	QC Batch: 88173
1,2,4-Trimethylbenzene	µg/L	0.97 U
1,3,5-Trimethylbenzene	µg/L	0.83 U
Benzene	µg/L	0.41 U
Ethylbenzene	µg/L	0.54 U
Methyl- <i>tert</i> -butyl ether	µg/L	0.61 U
Toluene	µg/L	0.67 U
Xylene (Total)	µg/L	2.6 U

Table 3-3. Surrogate Compound Recovery Data for Method 8260

Lab Sample Number	Field ID	4-Bromofluorobenzene		Dibromofluoromethane		Toluene- <i>d</i> ₈	
		Limits:	70	130	70	130	70
4054806001	121211001		77		89		86
4054806002	121211002		77		95		87
4054806003	121211003		76		89		83
4054806004	121211004		76		89		85
4054806005	121311001		76		91		86
4054806006	121311002		76		93		85
4054806007	121311003		75		92		87
4054806008	121311004		76		92		87
4054806009	121311005		76		96		86
4054806010	121311006		78		89		86
4054806011	121311007		75		92		86
4054806012	121311008		76		93		85
4054806013	121311009		77		93		86
4054806014	121311010		77		94		86
4054806015	121311011		75		92		88
4054806016	121411001		76		92		88
4054806017	121411002		76		92		87
4054806018	121411003		76		93		87
4054806019	121411004		75		94		87

Table 3-4. Method SW-846 8260 MS/MSD Recoveries

Analyte	MS Sample ID: 121311006			MSD Sample ID: 121311006			RPD	Lab Sample Result (µg/L)
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)		
Benzene	50	53.6	107	50	51.9	104	3	0.41 U
Ethylbenzene	50	56.8	114	50	56.9	114	0.1	0.54 U
Methyl- <i>tert</i> -butyl ether	50	46.2	92	50	46.6	93	0.7	0.61 U
Toluene	50	54.9	110	50	56	112	2	0.67 U
Xylene (Total)	150	161	107	150	158	105	2	2.6 U

Table 3-5. Laboratory Control Sample Recoveries 8260

Analyte	Recovery Limits (%)		QC Batch: 88173		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)
Benzene	70	130	50	53.3	107
Ethylbenzene	70	130	50	58.3	117
Methyl- <i>tert</i> -butyl ether	70	130	50	46.7	93
Toluene	70	130	50	57.0	114
Xylene (Total)	70	130	150	179	119

Table 3-6. Method SW-846 8260 Field Duplicates

Analyte	Sample ID: 121311001		Sample ID: 121311002		RPD	Sample ID: 121411001		Sample ID: 121411002		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
1,2,4-Trimethylbenzene	0.97	U	0.97	U	0.0	NR		NR		
1,3,5-Trimethylbenzene	0.83	U	0.83	U	0.0	NR		NR		
Benzene	0.41	U	0.41	U	0.0	0.41	U	0.41	U	0.0
Ethylbenzene	0.54	U	0.54	U	0.0	0.54	U	0.54	U	0.0
Methyl- <i>tert</i> -butyl ether	0.61	U	0.61	U	0.0	0.61	U	0.61	U	0.0
Toluene	0.67	U	0.67	U	0.0	0.67	U	0.67	U	0.0
Xylene (Total)	2.6	U	2.6	U	0.0	2.6	U	2.6	U	0.0

3.2 SW-846 Method 8270C/SIM –PAHs

3.2.1 Summary

SW-846 Method 8270C employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM) for polycyclic aromatic hydrocarbons.

3.2.2 Method Blanks

The samples were prepared in a single preparation batch. The method blank associated with these sample analyses gave a positive result for naphthalene above the detection limit but below the reporting limit. Validation guidance provided in the National Functional Guidelines directs the user to qualify positive results below the reporting limit for naphthalene for samples associated with these three method blanks as not detected at the reporting limit (“U”).

No other data are qualified due to the blank contamination.

The results for the method blanks are summarized in Table 3-7.

3.2.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore, an average response factor calibration model was used to quantitate all target analyte results.

The calibration data for the isomers benzo(b)fluoranthene and benzo(k)fluoranthene and the peak shapes evident in the sample chromatograms indicate that the two isomers are not adequately resolved to be quantitated separately as the laboratory attempted to do. In fact, the laboratory noted the chromatographic resolution issue in their comments in the report narrative. Based on this information, all positive results in all samples for these two isomers are qualified as estimated (“J”).

All of the continuing calibration verification (CCV) checks for Method 8270C-SIM performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. No data are qualified as a consequence of the continuing calibration data.

3.2.4 Internal Standard Areas

None of the sample analyses reported in this data set gave internal standard areas greater than 200% or less than 50% of the area response of the corresponding continuing calibration verification. Therefore, no data are qualified due to failed internal standard responses.

3.2.5 Surrogate Compound Recoveries

Two surrogate compounds, 2-Fluorobiphenyl, and Terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Additional surrogates are available in most analyses performed using Method 8270C, however, given the focused nature of the compounds of concern (i.e., PAHs), the surrogates reported should be adequate to monitor recovery in the analyses.

One sample, 121311011, gave a recovery for 2-Fluorobiphenyl below the lower limit used by the laboratory. In that lone instance the sample results were flagged by the laboratory using their “S0” and “1q” qualifiers to indicate a failed recovery and the unavailability of additional sample volume to perform a re-extraction. Sample results for this sample will be qualified as estimated with a potential low bias (“J-“). No further qualifiers are applied to the sample results.

The surrogate recoveries for all samples are presented in Table 3-8.

3.2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on sample 121311006.

All of the analytes for the MS/MSD sample recovered within the limits used by the laboratory.

The precision values as expressed by the relative percent difference (RPD) results indicate good analytical precision for the analyses (all values <20% RPD).

No data are qualified as a result of the MS/MSD recoveries.

The matrix spike/matrix spike duplicate results are summarized in Table 3-9.

3.2.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. All of the analytes for all of the laboratory control samples recovered within the limits used by the laboratory.

The laboratory control sample results are given in Table 3-10.

3.2.8 Field Duplicates

Field duplicates generally show good agreement for all of the analytes. Only two RPD values exceeded 30% where both values were above the reporting limit.

Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate “NDs”, however, are reported with 0% RPDs.

The National Functional Guidelines do not provide any guidance for qualifying data associated with field or sample duplicates for semivolatiles analyses. However, requirements that appear in the Multi-Site QAPP Addendum governing this project place a 30% limit on the RPD values

where the results are >2x the limit of quantitation. Using the QAPP criterion, positive values for fluoranthene, phenanthrene, and pyrene will be qualified as estimated (“J”).

The results of the duplicate analyses are given in Table 3-11. Values falling outside of stated limits are highlighted in *bold italic shaded* font.

Table 3-7. Method 8270-SIM Method Blank Analytical Results Summary

Analyte	Units	QC Batch: 88181
Acenaphthene	µg/L	0.0048 U
Acenaphthylene	µg/L	0.0038 U
Anthracene	µg/L	0.0061 U
Benzo(a)anthracene	µg/L	0.0038 U
Benzo(a)pyrene	µg/L	0.0030 U
Benzo(b)fluoranthene	µg/L	0.0036 U
Benzo(g,h,i)perylene	µg/L	0.0051 U
Benzo(k)fluoranthene	µg/L	0.0046 U
Chrysene	µg/L	0.0037 U
Dibenz(a,h)anthracene	µg/L	0.0034 U
Fluoranthene	µg/L	0.0047 U
Fluorene	µg/L	0.0051 U
Indeno(1,2,3-cd)pyrene	µg/L	0.0050 U
Naphthalene	µg/L	<i>0.0052 J</i>
Phenanthrene	µg/L	0.0086 U
Pyrene	µg/L	0.0050 U

Table 3-8. Surrogate Compound Recovery Data for Method 8270-SIM

Lab Sample Number	Field ID	2-Fluorobiphenyl		Terphenyl- <i>d</i> ₁₄	
		Limits:	27	130	66
4054806001	121211001		46		80
4054806002	121211002		46		82
4054806003	121211003		41		78
4054806004	121211004		51		85
4054806005	121311001		38		78
4054806006	121311002		41		84
4054806007	121311003		41		75
4054806008	121311004		41		77
4054806009	121311005		44		92
4054806010	121311006		41		84
4054806011	121311007		42		84
4054806012	121311008		85		109
4054806013	121311009		44		134
4054806014	121311010		44		69
4054806015	121311011		26 1q, 50		70
4054806016	121411001		49		86
4054806017	121411002		50		91
4054806018	121411003		47		93
4054806019	121411004		54		98

Table 3-9. Matrix Spike/Matrix Spike Duplicate Recoveries

Analyte	MS Sample ID: 121311006			MSD Sample ID: 121311006			RPD	Lab Sample Result (µg/L)
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)		
Acenaphthene	.19	0.13	63	.19	0.11	54	16	0.0071 J
Acenaphthylene	.19	0.12	62	.19	0.1	54	15	0.0036 U
Anthracene	.19	0.12	61	.19	0.11	54	12	0.0072 J
Benzo(a)anthracene	.19	0.18	84	.19	0.19	87	3	0.023 J
Benzo(a)pyrene	.19	0.20	91	.19	0.21	96	5	0.031 J
Benzo(b)fluoranthene	.19	0.20	89	.19	0.21	95	5	0.028 J
Benzo(g,h,i)perylene	.19	0.22	100	.19	0.23	106	5	0.030 J
Benzo(k)fluoranthene	.19	0.21	91	.19	0.22	98	7	0.035 J
Chrysene	.19	0.24	104	.19	0.26	111	5	0.045 J
Dibenz(a,h)anthracene	.19	0.19	97	.19	0.19	100	3	0.0037 J
Fluoranthene	.19	0.23	84	.19	0.24	90	4	0.075
Fluorene	.19	0.12	62	.19	0.1	53	16	0.0048 U
Indeno(1,2,3-cd)pyrene	.19	0.20	97	.19	0.21	102	5	0.021 J
Naphthalene	.19	0.12	53	.19	0.1	45	14	0.016 JB
Phenanthrene	.19	0.16	68	.19	0.13	56	16	0.027 J
Pyrene	.19	0.22	85	.19	0.24	91	5	0.064

Table 3-10. Method 8270-SIM Laboratory Control Sample Results Summary

Analyte	Recovery Limits (%)		QC Batch: 88181		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)
Acenaphthene	30	130	0.2	0.16	80
Acenaphthylene	23	130	0.2	0.15	76
Anthracene	20	130	0.2	0.17	86
Benzo(a)anthracene	34	130	0.2	0.15	73
Benzo(a)pyrene	41	130	0.2	0.20	100
Benzo(b)fluoranthene	31	131	0.2	0.16	81
Benzo(g,h,i)perylene	51	130	0.2	0.19	97
Benzo(k)fluoranthene	56	130	0.2	0.23	114
Chrysene	55	130	0.2	0.25	125
Dibenz(a,h)anthracene	40	130	0.2	0.18	92
Fluoranthene	38	130	0.2	0.20	98
Fluorene	27	130	0.2	0.16	82
Indeno(1,2,3-cd)pyrene	48	130	0.2	0.19	94
Naphthalene	33	130	0.2	0.15	76
Phenanthrene	28	130	0.2	0.15	76
Pyrene	41	130	0.2	0.19	96

Table 3-11. Method SW-846 8270-SIM Field Duplicate Analytical Result Summary

Analyte	Sample ID: 121311001		Sample ID: 121311002		RPD	Sample ID: 121411001		Sample ID: 121411002		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
Acenaphthene	0.0066	J	0.0081	J	20.4	0.010	J	0.011	J	9.5
Acenaphthylene	0.0070	J	0.0082	J	15.8	0.011	J	0.013	J	16.7
Anthracene	0.011	J	0.011	J	0.0	0.014	J	0.022	J	44.4
Benzo(a)anthracene	0.030	J	0.033	J	9.5	0.029	J	0.061		71.1
Benzo(a)pyrene	0.042	J	0.041	J	2.4	0.026	J	0.055		71.6
Benzo(b)fluoranthene	0.035	J	0.031	J	12.1	0.031	J	0.073		80.8
Benzo(g,h,i)perylene	0.038	J	0.036	J	5.4	0.026	J	0.058		76.2
Benzo(k)fluoranthene	0.049		0.046	J	6.3	0.027	J	0.056		69.9
Chrysene	0.064		0.063		1.6	0.036	J	0.075		70.3
Dibenz(a,h)anthracene	0.0065	J	0.0071	J	8.8	0.0053	J	0.012	J	77.5
Fluoranthene	0.099		0.10		1.0	0.079		0.15		62.0
Fluorene	0.0049	J	0.0055	J	11.5	0.010	J	0.0097	J	3.0
Indeno(1,2,3-cd)pyrene	0.027	J	0.024	J	11.8	0.019	J	0.042	J	75.4
Naphthalene	0.0091	JB	0.0087	JB	4.5	0.019	JB	0.019	JB	0.0
Phenanthrene	0.035	J	0.048		31.3	0.060		0.082		31.0
Pyrene	0.087		0.090		3.4	0.072		0.13		57.4

3.3 SW-846 Method 8270C –Phenols

3.3.1 Summary

SW-846 Method 8270C employs gas chromatographic separation with mass spectroscopic identification for the phenolic compounds of interest.

3.3.2 Method Blanks

The samples were prepared in a single preparation batch. The method blank associated with these sample analyses did not give any positive results for any of the phenolic compounds above the detection limit. Therefore, no data are qualified due to the blank contamination.

The results for the two method blanks are summarized in Table 3-12.

3.3.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. All reported DFTPP tunes passed the established criteria. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all target analyte results.

All of the initial calibration verification (ICV) and continuing calibration verification (CCV) checks for Method 8270C performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. No data are qualified as a consequence of the calibration verification data.

3.3.4 Surrogate Compound Recoveries

Six surrogate compounds were spiked into each of the samples. Since the compounds of interest for most of the samples in the current investigation are selected phenolic compounds, only the acid surrogates were considered as part of the validation process.

None of the acid surrogate compounds recovered outside of the laboratory's limits for any of the samples in these SDGs. Hence, no data are qualified as a result of surrogate recovery data.

The acid surrogate recoveries for all samples are presented in Table 3-13.

3.3.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were not performed for this analysis. Insufficient sample was available to perform the analysis.

3.3.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. All of the target analytes for all of the laboratory control samples recovered within the limits used by the laboratory. Therefore, no data are qualified based upon the LCS recoveries.

The laboratory control sample results are given in Table 3-14.

3.3.7 Field Duplicates

Field duplicates show excellent agreement for all of the analytes. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate “NDs”, however, are reported with 0% RPDs. Given the fact that none of the target phenolic compounds were detected in either of the field duplicate samples, no results for any field samples associated with these duplicate pairs are qualified based upon field duplicate data.

The results of the duplicate analyses are given in Table 3-15.

Table 3-12. Method 8270 Method Blank Analytical Results Summary

Analyte	Units	QC Batch: 88280	QC Batch: 88355
2,4-Dimethylphenol	µg/L	1.1 U	1.1 U
2-Methylphenol(<i>o</i> -Cresol)	µg/L	0.97 U	0.97 U
3&4-Methylphenol(<i>m&p</i> -Cresol)	µg/L	0.77 U	0.77 U
Phenol	µg/L	1.0 U	1.0 U

Table 3-13. Surrogate Compound Recovery Data for Method 8270

Lab Sample Number	Field ID	2,4,6-Tribromophenol		2-Fluorophenol		Phenol- <i>d</i> ₅	
		Limits:	36	130	24	130	13
4054806001	121211001		97		48		29
4054806002	121211002		93		48		30
4054806003	121211003		99		49		34
4054806004	121211004		96		46		32
4054806005	121311001		93		44		29
4054806006	121311002		88		47		32
4054806007	121311003		98		49		33
4054806008	121311004		89		49		33
4054806009	121311005		99		48		33
4054806010	121311006		94		44		30
4054806011	121311007		96		45		31
4054806012	121311008		98		40		27
4054806013	121311009		91		50		32
4054806014	121311010		93		52		33
4054806015	121311011		90		51		33
4054806016	121411001		100		47		30
4054806017	121411002		96		50		31
4054806018	121411003		93		43		33
4054806019	121411004		99		45		34

Table 3-14. Laboratory Control Sample Recoveries 8270

Analyte	Recovery Limits (%)		QC Batch: 88280			QC Batch: 88355		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2,4-Dimethylphenol	17	130	50	33.0	66	50	30.4	61
2-Methylphenol(<i>o</i> -Cresol)	36	130	50	35.7	71	50	36.5	73
3&4-Methylphenol(<i>m</i> & <i>p</i> -Cresol)	34	130	50	32.8	66	50	34.1	68
Phenol	26	130	50	20.5	41	50	20.5	41

Table 3-15. Method SW-846 8270 Field Duplicates

Analyte	Sample ID: 121311001		Sample ID: 121311002		RPD	Sample ID: 121411001		Sample ID: 121411002		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
2,4-Dimethylphenol	1.1	U	1.1	U	0.0	1.1	U	1.1	U	0.0
2-Methylphenol(<i>o</i> -Cresol)	0.92	U	0.92	U	0.0	0.92	U	0.94	U	0.0
3&4-Methylphenol(<i>m</i> & <i>p</i> -Cresol)	0.72	U	0.72	U	0.0	0.72	U	0.74	U	0.0
Phenol	0.98	U	0.98	U	0.0	0.98	U	0.99	U	0.0

3.4 SW-846 Method 8082A, Polychlorinated Biphenyls (PCBs)

3.4.1 Summary

Surface water samples were analyzed for polychlorinated biphenyls (PCBs) using SW-846 Method 8082A. Method 8082A employs gas chromatographic separation with a halogen specific electron capture detector. Identification is accomplished by comparing retention times and elution patterns to known standards and confirmed by analysis on a second gas chromatographic column of dissimilar phase.

Overall, analytical batch QC data indicated acceptable precision and accuracy.

The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples.

3.4.2 Sample Receipt

All samples were received by the laboratory in good condition, cold (4°C ± 2°C) and intact. All samples were prepared and analyzed within the prescribed holding times.

3.4.3 Method Blanks

A laboratory method blank was prepared and analyzed for each analytical batch. The method blank consisted of an aliquot of sodium sulfate extracted as a sample. None of the PCBs were detected above the detection limit in the method blanks for the sediment samples. Therefore, none of the data were flagged, and no data were adjusted as a result of blank contamination.

The method blank results are summarized in Table 3-16.

3.4.4 Calibration

All initial calibration acceptance criteria were met for all of the analytes. Multi-point calibration curves were developed using Aroclors 1016 and 1260. The remaining Aroclor mixtures were calibrated using a single point calibration standard.

Multiple calibration verifications (CCVs) were performed in the course of these analyses. Only one of the several CCV results associated with these analyses gave results exceeding the 15% acceptance criterion. However, the lone result exceeding 15% came as a “closing CCV” at the end of the analytical sequence. In the case of a closing CCV, the CLP NFG for PCBs allows up to 50% difference. Hence, no data are qualified as a consequence of the calibration verification results.

3.4.5 Surrogate Compound Recoveries

Two surrogates, tetrachloro-*m*-xylene (TCMX) and decachlorobiphenyl (DCB), were spiked into each field sample to monitor method recovery. Use of these two compounds as surrogates is consistent with the SW-846 guidance.

All recoveries were within limits used by the laboratory. Therefore no data are qualified due to surrogate compound recovery.

The surrogate recoveries for all sample analyses are presented in Table 3-17.

3.4.6 Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicate (MS/MSD) analyses were not performed for this analysis. Insufficient sample was available to perform the analysis.

3.4.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed for each analytical batch. None of the recoveries exceeded the laboratory’s control limits for any of the PCB mixtures, hence there is no need for any further qualification of the data.

The laboratory control sample results are presented in Table 3-18.

3.4.8 Field Duplicates

One field duplicate pair was analyzed for this set of samples. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate “NDs”, however, are reported with 0% RPDs.

Since none of the target Aroclor mixtures were detected in the samples, none of the calculated RPD values were greater than the 30% RPD limit published in the Multi-Site QAPP Addendum. Therefore, no data are qualified based upon the field duplicates.

The results of the duplicate analyses are given in Table 3-19.

Table 3-16. Method 8082 Method Blank Analytical Results Summary

Analyte	Units	QC Batch: 88264
PCB-1016 (Aroclor 1016)	µg/L	0.30 U
PCB-1221 (Aroclor 1221)	µg/L	0.30 U
PCB-1232 (Aroclor 1232)	µg/L	0.30 U
PCB-1242 (Aroclor 1242)	µg/L	0.30 U
PCB-1248 (Aroclor 1248)	µg/L	0.30 U
PCB-1254 (Aroclor 1254)	µg/L	0.30 U
PCB-1260 (Aroclor 1260)	µg/L	0.30 U

Table 3-17. Surrogate Compound Recovery Data for Method 8082

Lab Sample Number	Field ID	Decachlorobiphenyl	
		Limits:	
		31	130
4054806001	121211001	79	
4054806003	121211003	80	
4054806005	121311001	79	
4054806006	121311002	81	
4054806008	121311004	74	
4054806010	121311006	56	
4054806011	121311007	86	
4054806012	121311008	79	
4054806013	121311009	80	
4054806015	121311011	71	

Table 3-18. Laboratory Control Sample Recoveries 8082

Analyte	Recovery Limits (%)		QC Batch: 88264		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)
PCB-1260 (Aroclor 1260)	51	142	5	5.2	104

Table 3-19. Method SW-846 88082 Field Duplicates

Analyte	Sample ID: 121311001		Sample ID: 121311002		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
PCB, Total	0.29	U	0.29	U	0.0
PCB-1016 (Aroclor 1016)	0.29	U	0.29	U	0.0
PCB-1221 (Aroclor 1221)	0.29	U	0.29	U	0.0
PCB-1232 (Aroclor 1232)	0.29	U	0.29	U	0.0
PCB-1242 (Aroclor 1242)	0.29	U	0.29	U	0.0
PCB-1248 (Aroclor 1248)	0.29	U	0.29	U	0.0
PCB-1254 (Aroclor 1254)	0.29	U	0.29	U	0.0
PCB-1260 (Aroclor 1260)	0.29	U	0.29	U	0.0

Data Validation Report
2069 NORTH BRANCH
(Division Street Former MGP Site
and Willow Street / Hawthorne Avenue Station OU)

Surface Water Analyses Performed by

Pace Analytical, Green Bay
and
TestAmerica, Pittsburgh

Prepared for



Prepared by

SHEPHERD TECHNICAL SERVICES

May 16, 2013

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1.0 INTRODUCTION

All data validation was performed by Shepherd Technical Services following US EPA National Functional Guidelines (NFG), where applicable, using electronic deliverables. Guidance and requirements appearing in the Multi-Site Quality Assurance Project Plan, Rev. 2, 2007 (Multi-Site QAPP”) were also used in the validation process.

Pace Analytical Services, Inc., Green Bay, WI performed the sample analyses on the surface water samples. The Pace Green Bay laboratory maintains certification under the Illinois EPA Laboratory Accreditation Program (ID #200050). The Pace laboratory is also accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the Florida Department of Health Laboratory Accreditation Program (ID #E87948).

Sample analyses for available cyanide were performed by TestAmerica, Pittsburgh, PA. The TestAmerica laboratory maintains accreditation under the Pennsylvania Department of Environmental Protection Environmental Laboratory Accreditation Program (PADEP ELAP #02-0046).

The laboratories provided all analytical data, including all internal laboratory QC results in an electronic deliverable format.

A total of 44 surface water samples and 2 trip blanks were collected November 12-14, 2012 at the Division Street Station and Willow Street/Hawthorne Avenue Station sites. Samples were organized into 3 sample delivery groups (SDGs, or laboratory lot numbers) performed by Pace and 1 SDG by TestAmerica. The samples were analyzed for the indicated parameters using the methods listed in Table 1-1.

Table 1-1. Sample/SDG Cross Reference

Field ID	Pace Sample ID	TestAmerica Sample ID	EPA 6020 Hardness SM 2340B	EPA 7470	EPA 8082	EPA 8260	EPA 8270	EPA 8270-SIM	EPA OIA-1677
111212001	4070486001	180-16510-1	X	X	X	X	X	X	X
111212002	4070486002	180-16510-2	X	X	X	X	X	X	X
111212003	4070486003	180-16510-3	X	X		X	X	X	X
111212004	4070486004	180-16510-4	X	X	X	X	X	X	X
111212005	4070486005	180-16510-5	X	X		X	X	X	X
111212006	4070486006	180-16510-6	X	X	X	X	X	X	X
111212007	4070486007	180-16510-7	X	X		X	X	X	X
111212008	4070486008	180-16510-8	X	X	X	X	X	X	X
111212009	4070486009	180-16510-9	X	X		X	X	X	X
111312001	4070563001	180-16510-10	X	X	X	X	X	X	X
111312002	4070563002	180-16510-11	X	X	X	X	X	X	X
111312003	4070563003	180-16510-12	X	X	X	X	X	X	X

111312004	4070563004	180-16510-13	X	X	X	X	X	X	X
111312005	4070563005	180-16510-14	X	X		X	X	X	X
111312006	4070563006	180-16510-15	X	X		X	X	X	X
111312007	4070563007	180-16510-16	X	X		X	X	X	X
111312008	4070563008	180-16510-17	X	X		X	X	X	X
111312009	4070563009	180-16510-18	X	X		X	X	X	X
111312010	4070563010	180-16510-19	X	X		X	X	X	X
111312011	4070563011	180-16510-20	X	X		X	X	X	X
111412001	4070654001	180-16510-21	X	X		X	X	X	X
111412002	4070654002	180-16510-22	X	X		X	X	X	X
TB	4070654003					X			
TRIP BLANK	4070563012					X			

2.0 INORGANIC DATA REVIEW

2.1 Summary

Blank, spiked, and duplicate results were provided. Overall, QC data indicated acceptable precision and accuracy. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples.

2.2 Sample Receipt and Methodology

The samples were analyzed for inorganic parameters following the methods cited in the table below. Hardness 2340B is hardness by calculation using results from calcium and magnesium determined using EPA SW-846 Method 6020A.

Table 2-1. Inorganic Analytes and Methods Summary

Analyte	Analytical Method
Metals and Hardness (2340B)	SW-846 6020A
Mercury	SW-846 7470A
Available Cyanide	EPA OIA-1677

Generally, the samples arrived at the laboratories properly preserved and in good condition. All samples were analyzed within the prescribed holding times where holding times have been defined.

2.3 Calibration

Initial instrument calibrations for each of the methods were all within acceptance criteria.

All of the calibration verification checks (CCVs) performed for these analyses met the $\pm 10\%$ acceptance criterion used by the laboratory and required by the methods. No data are qualified as a consequence of the calibration data.

2.4 Blanks

The initial and continuing calibration blanks (ICBs/CBBs) for ICP/MS metals on some occasions gave values slightly above the limit of detection (or the negative of the limit of detection) but below the reporting limit (limit of quantitation) for most of these elements. Affected sample results for these elements above the MDL but less than the reporting limit will be qualified at the reporting limit with a “U”. Since there was no contamination found in the preparation blanks, results above the reporting limit will not be qualified.

The initial and continuing calibration blanks (ICBs/CBBs) for mercury all gave results below the limit of detection. Therefore no data are qualified as a consequence of the calibration blank data.

The initial and continuing calibration blanks (ICBs/CBBs) for available cyanide all gave results below the limit of detection. Therefore no data are qualified as a consequence of the calibration blank data.

Method blanks were prepared for each batch of samples prepared for analysis for each method.

None of the method blanks for total metals, mercury, or available cyanide gave any results above the detection limit.

The method blank results are summarized in Tables 2-2 through 2-4.

Table 2-2. Total Metals Method Blank Results Summary

Analyte	Units	QC Batch: 115795	QC Batch: 116629
Aluminum	$\mu\text{g/L}$	12.0 U	12.0 U
Antimony	$\mu\text{g/L}$	0.12 U	0.12 U
Arsenic	$\mu\text{g/L}$	0.19 U	0.19 U
Barium	$\mu\text{g/L}$	0.14 U	0.14 U
Cadmium	$\mu\text{g/L}$	0.13 U	0.13 U
Chromium	$\mu\text{g/L}$	0.12 U	0.12 U
Copper	$\mu\text{g/L}$	0.38 U	0.38 U
Iron	$\mu\text{g/L}$	10.4 U	10.4 U
Lead	$\mu\text{g/L}$	0.061 U	0.061 U
Manganese	$\mu\text{g/L}$	0.32 U	0.32 U
Nickel	$\mu\text{g/L}$	0.16 U	0.16 U
Selenium	$\mu\text{g/L}$	0.40 U	0.40 U
Silver	$\mu\text{g/L}$	0.059 U	0.059 U
Vanadium	$\mu\text{g/L}$	0.31 U	0.31 U
Zinc	$\mu\text{g/L}$	4.1 U	4.1 U

Table 2-3. Mercury Method Blank Results Summary

Parameter	Batch	Units	Result
Mercury	116546	µg/L	0.10 U
	116767	µg/L	0.10 U
	116869	µg/L	0.10 U

Table 2-4. Available Cyanide Method Blank Results Summary

Analyte	Units	QC Batch: 180-55937
Available cyanide	mg/L	0.0014 U

2.5 Laboratory Control Samples

Laboratory control samples (LCS) were analyzed with each of the data sets.

Laboratory control samples were prepared using commercially available reference materials.

The recovery limits used by the laboratory for LCS results are either those given in the method guidance or are based upon laboratory performance. All recoveries for all analytes for all tests were within the specified limits.

Recoveries are given along with the acceptance limits in Tables 2-5 through 2-7.

Table 2-5. Total Metals Laboratory Control Sample Recoveries

Analyte	Spike (µg/L)	Recovery Limits (%)		QC Batch: MPRP/7792		QC Batch: MPRP/7837	
		Lower	Upper	Result (µg/L)	Recovery (%)	Result (µg/L)	Recovery (%)
Aluminum	5000	80	120	5220	104	5100	102
Antimony	500	80	120	514	103	537	107
Arsenic	500	80	120	538	108	528	106
Barium	500	80	120	500	100	504	101
Cadmium	500	80	120	526	105	540	108
Chromium	500	80	120	523	105	517	103
Copper	500	80	120	511	102	536	107
Iron	5000	80	120	5450	109	5100	102
Lead	500	80	120	496	99	526	105
Manganese	500	80	120	520	104	510	102
Nickel	500	80	120	505	101	517	103
Selenium	500	80	120	549	110	536	107
Silver	250	80	120	259	103	272	109
Vanadium	500	80	120	514	103	515	103
Zinc	500	80	120	518	104	521	104

Table 2-6. Mercury Laboratory Control Sample Recoveries

QC Batch for EPA 7470	Analyte	Recovery Limits (%)		Spike (µg/L)	Result (µg/L)	Recovery
		Lower	Upper			
116546	Mercury	85	115	5	5.4	108
116767	Mercury	85	115	5	5.0	100
116869	Mercury	85	115	5	5.1	102

Table 2-7. Available Cyanide Laboratory Control Sample Recoveries

QC Batch for EPA OIA-1677	Analyte	Recovery Limits (%)		Spike (mg/L)	Result (mg/L)	Recovery
		Lower	Upper			
180-55937	Available cyanide	82	132	0.100	0.0930	93
		82	132	0.100	0.114	114
		82	132	0.100	0.100	100
		82	132	0.100	0.0970	97

2.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were evaluated for each of the parameters at appropriate frequencies. All recoveries for all analytes for all tests were within the specified limits.

The MS/MSD data are given in Tables 2-8 through 2-11.

Table 2-8. Total Metals MS/MSD Recoveries

Analyte	MS Sample ID: 111312001			MSD Sample ID: 111312001			RPD	Lab Sample Result (µg/L)	Max RPD
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)			
Aluminum	5000	5450	105	5000	5310	103	3	178 J	20
Antimony	500	517	103	500	520	104	1	0.44 J	20
Arsenic	500	542	108	500	532	106	2	0.70 J	20
Barium	500	527	102	500	529	102	0	19.5	20
Cadmium	500	516	103	500	526	105	2	0.13 U	20
Chromium	500	518	103	500	503	100	3	0.70 J	20
Copper	500	508	101	500	499	99	2	4.0	20
Iron	5000	5580	107	5000	5430	104	3	230 J	20
Lead	500	507	101	500	503	100	1	1.3	20
Manganese	500	541	104	500	525	101	3	22.0	20
Nickel	500	509	101	500	489	97	4	2.9	20
Selenium	500	538	108	500	537	107	0	0.40 U	20
Silver	250	253	101	250	255	102	1	0.059 U	20
Vanadium	500	511	102	500	501	100	2	0.64 J	20
Zinc	500	538	102	500	528	100	2	26.6	20

Table 2-9. Total Metals MS/MSD Recoveries

Analyte	MS Sample ID: 111412001			MSD Sample ID: 111412001			RPD	Lab Sample Result (µg/L)	Max RPD
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)			
Aluminum	5000	5350	102	5000	5320	101	1	248 J	20
Antimony	500	538	107	500	538	108	0	.74 J	20
Arsenic	500	535	107	500	534	106	0	1.4	20
Barium	500	529	102	500	528	102	0	19.3	20
Cadmium	500	532	106	500	531	106	0	0.41 J	20
Chromium	500	512	102	500	511	102	0	1.4	20
Copper	500	519	103	500	518	103	0	4.5	20
Iron	5000	5350	101	5000	5310	100	1	297	20
Lead	500	540	107	500	535	106	1	2.5	20
Manganese	500	528	102	500	526	102	0	18.2	20
Nickel	500	504	100	500	502	100	1	3.8	20
Selenium	500	540	108	500	538	107	0	0.85 J	20
Silver	250	258	103	250	257	103	1	0.21 J	20
Vanadium	500	515	103	500	514	103	0	1.3	20
Zinc	500	539	102	500	538	102	0	27.2	20

Table 2-10. Mercury MS/MSD Recoveries

Sample ID	Analyte	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	MSD Result (µg/L)	Recovery (%)	RPD	Lab Sample Result (µg/L)	Max RPD
111212001	Mercury	5	5.3	106	5.1	102	4	0.10U	20
111312001	Mercury	5	5.0	99	4.7	93	6	0.10 U	20
111412001	Mercury	5	5.1	102	5	100	3	0.10U	20

Table 2-11. Available Cyanide MS/MSD Recoveries

Sample ID	Analyte	Spike (mg/L)	MS Result (mg/L)	Recovery (%)	MSD Result (mg/L)	Recovery (%)	RPD	Lab Sample Result (mg/L)	Max RPD
111312001	Available cyanide	0.100	0.112	112	0.100	100	11	ND	11

2.7 ICP/MS Serial Dilutions

All serial dilution tests met the acceptance criterion defined in the test method for all of the metals. Consequently no results are qualified due to serial dilution failures.

2.8 Field Duplicates

Field duplicates were collected and analyzed for all of the inorganic parameters. Field duplicates generally show excellent agreement for all of the analytes where the values are above the sample quantitation limit. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate “NDs”, however, are reported with 0% RPDs.

Criteria for evaluating field duplicate precision is provided in the Multi-Site QAPP Addendum dated March 12, 2012. Worksheet #28 of that addendum defines and upper limit of 30% RPD for precision between field duplicate values for inorganic parameters. All inorganic results met this criterion so no data are qualified as a result of field duplicates.

The results of the duplicate analyses are given in Tables 2-12 through 2-14.

Table 2-12. Total Metals Field Duplicates

Analyte	Sample ID: 111212001		Sample ID: 111212002		RPD	Sample ID: 111312005		Sample ID: 111312006		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
Aluminum	276		283		2.5	230	J	201	J	13.5
Antimony	0.42	J	0.33	J	24.0	0.34	J	0.35	J	2.9
Arsenic	0.70	J	0.57	J	20.5	0.88	J	0.79	J	10.8
Barium	18.7		18.0		3.8	19.3		19.1		1.0
Cadmium	0.13	U	0.13	U	0.0	0.13	U	0.13	U	0.0
Chromium	0.88	J	0.94	J	6.6	0.89	J	0.93	J	4.4
Copper	3.8		3.5		8.2	4.0		3.8		5.1
Iron	329		312		5.3	269		249	J	7.7
Lead	1.3		1.2		8.0	2.2		2.0		9.5
Manganese	14.3		14.0		2.1	14.6		14.0		4.2
Nickel	4.0		3.6		10.5	3.6		3.5		2.8
Selenium	0.40	U	0.46	J	NC	0.40	U	0.44	J	NC
Silver	0.059	U	0.059	U	0.0	0.059	U	0.059	U	0.0
Vanadium	0.74	J	0.62	J	17.6	0.54	J	0.50	J	7.7
Zinc	22.8		22.1		3.1	25.5		24.0		6.1
Total Hardness by 2340B	175		173		1.1	189		189		0.0

Table 2-13. Mercury Field Duplicates

Analyte	Sample ID: 111212001		Sample ID: 111212002		RPD	Sample ID: 111312005		Sample ID: 111312006		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
Mercury	0.10	U	0.10	U	0.0	0.10	U	0.10	U	0.0

Table 2-14. Available Cyanide Field Duplicates

Analyte	Sample ID: 111212001		Sample ID: 111212002		RPD	Sample ID: 111312005		Sample ID: 111312006		RPD
	Result (mg/L)	Lab Flag	Result (mg/L)	Lab Flag		Result (mg/L)	Lab Flag	Result (mg/L)	Lab Flag	
Available cyanide	ND	U	ND	U	0.0	ND	U	ND	U	0.0

3.0 ORGANIC DATA REVIEW

Blank, spiked, and duplicate results were provided. The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples. Ottawa sand was used as the matrix for VOC method blank analysis. Sodium sulfate was used as the matrix for method blanks for the semivolatile organics (PAHs, PCBs, SVOCs,) analyses.

Samples were analyzed for organic compounds following SW-846 Methods or laboratory developed methods as shown in Table 3-1.

Table 3-1. Organic Analytes and Methods Summary

Analytical Method	Analyte
EPA 8260	Purgeable Volatile Organic Compounds (PVOC)
EPA 8270	Semivolatile Organic Compounds (SVOC)
EPA 8270 -SIM	Polycyclic Aromatic Hydrocarbons (PAH)
EPA 8082	PCBs

Generally, all samples were received by the laboratory in good condition and intact. Therefore, no data are qualified based upon sample receipt conditions.

3.1 SW-846 Method 8260B – Purgeable Volatile Organic Compounds

3.1.1 Summary

SW-846 Method 8260B employs gas chromatographic separation with a mass spectrometer as a detector.

3.1.2 Method Blanks

The samples were analyzed in three analytical batches. None of the method blanks associated with these analytical batches showed any detectable contamination. Therefore, no data are qualified as a consequence of the method blank data.

The method blank data are summarized in Table 3-2.

Table 3-2. Method 8260 Method Blank Results Summary

Analyte	Units	QC Batch: 115784	QC Batch: 116072	QC Batch: 116074
1,2,4-Trimethylbenzene	µg/L	0.97 U	0.97 U	0.97 U
1,3,5-Trimethylbenzene	µg/L	0.83 U	0.83 U	0.83 U
Benzene	µg/L	0.41 U	0.41 U	0.41 U
Ethylbenzene	µg/L	0.54 U	0.54 U	0.54 U
Toluene	µg/L	0.67 U	0.67 U	0.67 U
Xylene (Total)	µg/L	2.6 U	2.6 U	2.6 U

3.1.2 Trip Blanks, Field Blanks, Equipment Blanks

Two trip blanks were provided with this sample set. None of the trip blanks associated with these samples gave results above the detection limit.

No data are qualified as a consequence of any of the field quality control blanks.

3.1.3 Calibration

All initial calibration criteria were met for all compounds. All analytes fit first order linear regression curves and gave average response factors (RFs) with <15% RSD over the average. Therefore average RFs were used in sample quantitation. No data are qualified as a result of the initial calibration data.

For evaluating calibration verifications, the June 2008 CLP National Functional Guidelines have established a $\pm 40\%$ drift or difference acceptability criterion for analytes known to exhibit poor response and a $\pm 25\%$ drift or difference criterion for all other target analytes. None of the analytes of concern in this investigation are considered to exhibit poor response. The calibration verification associated with this data set did not exceed the $\pm 25\%$ difference criterion in place for

all other target analytes. Consequently, no data are qualified as a result of the calibration verification data.

3.1.4 Surrogate Compound Recoveries

Three surrogate compounds, 4-bromofluorobenzene, toluene-*d*₈, and dibromofluoromethane were spiked into each field sample to monitor analyte recovery in the analytical system. The surrogates used by the laboratory are acceptable to measure recovery under EPA SW-846 guidance for this analytical method.

No data are qualified based upon surrogate compound recoveries.

Recoveries for all surrogates for all samples are presented in Table 3-3.

Table 3-3. Method 8260 Surrogate Compound Recoveries

Lab Sample Number	Field ID	4-Bromofluorobenzene		Dibromofluoromethane		Toluene- <i>d</i> ₈	
	Limits:	43	137	70	130	55	137
4070486001	111212001	76		111		101	
4070486002	111212002	77		113		101	
4070486003	111212003	75		108		100	
4070486004	111212004	75		111		100	
4070486005	111212005	75		115		100	
4070486006	111212006	75		112		99	
4070486007	111212007	77		106		102	
4070486008	111212008	76		108		98	
4070486009	111212009	77		114		98	
4070563001	111312001	77		103		102	
4070563002	111312002	76		110		100	
4070563003	111312003	78		106		99	
4070563004	111312004	77		110		99	
4070563005	111312005	76		108		101	
4070563006	111312006	76		113		100	
4070563007	111312007	76		110		100	
4070563008	111312008	76		110		101	
4070563009	111312009	77		112		102	
4070563010	111312010	76		114		101	
4070563011	111312011	75		110		101	
4070563012	TRIP BLANK	76		121		100	
4070654001	111412001	77		111		99	
4070654002	111412002	78		111		98	
4070654003	TB	77		120		98	

3.1.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed for one sample as specified by the project team in accordance with the Sampling and Analysis Plan.

None of the target compounds recovered outside of the limits established by the laboratory for the MS/MSD pair. No results are qualified due to MS/MSD.

The MS/MSD results are summarized in Table 3-4.

Table 3-4. Method 8260 MS/MSD Recoveries

Analyte	MS Sample ID: 111312001			MSD Sample ID: 111312001			RPD	Lab Sample Result (µg/L)	Max RPD
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)			
Benzene	50	53.7	107	50	53	106	1	0.41 U	20
Ethylbenzene	50	57.4	115	50	57.3	115	0	0.54 U	20
Toluene	50	58.8	118	50	57.6	115	2	0.67 U	20
Xylene (Total)	150	169	113	150	168	112	1	2.6 U	20

3.1.6 Laboratory Control Samples

A Laboratory Control Sample (LCS) analysis was performed for each batch of sample analyzed.

None of the target compounds recovered outside of the limits established by the laboratory for any the LCS analyses for this method. Therefore no data are qualified as a consequence of the LCS recoveries.

The LCS results are summarized in Table 3-5.

Table 3-5. Method 8260 Laboratory Control Sample Recoveries

Analyte	Spike (µg/L)	Recovery Limits (%)		QC Batch: 115784		QC Batch: 116072		QC Batch: 116074	
		Lower	Upper	Result (µg/L)	Recovery (%)	Result (µg/L)	Recovery (%)	Result (µg/L)	Recovery (%)
Benzene	50	70	137	52.7	105	51.7	103	53.2	106
Ethylbenzene	50	70	130	57.5	115	56.9	114	57.6	115
Toluene	50	70	130	58.9	118	57.3	115	58.4	117
Xylene (Total)	150	70	130	174	116	170	113	174	116

3.1.7 Field Duplicates

Field duplicates generally show good agreement for all of analytes with all RPD values <30%. Precision is only calculated where both the sample and the duplicate sample gave a positive result. Duplicate “NDs”, however, are reported with 0% RPDs. No results are qualified based on filed duplicate results.

The results of the field duplicate analyses are given in Table 3-6.

Table 3-6. Method 8260 Field Duplicates

Analyte	Sample ID: 111212001		Sample ID: 111212002		RPD	Sample ID: 111312005		Sample ID: 111312006		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
1,2,4-Trimethylbenzene	0.97	U	0.97	U	0.0	0.97	U	0.97	U	0.0
1,3,5-Trimethylbenzene	0.83	U	0.83	U	0.0	0.83	U	0.83	U	0.0
Benzene	0.41	U	0.41	U	0.0	0.41	U	0.41	U	0.0
Ethylbenzene	0.54	U	0.54	U	0.0	0.54	U	0.54	U	0.0
Toluene	0.67	U	0.67	U	0.0	0.67	U	0.67	U	0.0
Xylene (Total)	2.6	U	2.6	U	0.0	2.6	U	2.6	U	0.0

3.2 SW-846 Method 8270C–Phenols

3.2.1 Summary

SW-846 Method 8270C employs gas chromatographic separation with mass spectroscopic identification for the phenolic compounds of interest.

3.2.2 Method Blanks

The samples were prepared in two different preparation batches. None of the method blanks associated with these sample analyses showed any contamination for any of the target compounds above the detection limit. Hence, no data are qualified due to the blank contamination.

The results for the two method blanks are summarized in Table 3-7.

Table 3-7. Method 8270 Method Blank Results Summary

Analyte	Units	QC Batch: 115911	QC Batch: 116342
2,4-Dimethylphenol	µg/L	1.1 U	1.1 U
2-Methylphenol(<i>o</i> -Cresol)	µg/L	0.97 U	0.97 U
3&4-Methylphenol(<i>m&p</i> Cresol)	µg/L	0.77 U	0.77 U
Phenol	µg/L	1.0 U	1.0 U

3.2.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. All reported DFTPP tunes passed the established criteria. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all target analyte results.

All of the initial calibration verification (ICV) and continuing calibration verification (CCV) checks for Method 8270C performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes.

No data are qualified as a consequence of the calibration data.

3.2.4 Surrogate Compound Recoveries

Six surrogate compounds were spiked into each of the samples. Since the compounds of interest for the current investigation are selected phenolic compounds, only the acid surrogates are considered as part of the validation process. Hence only values for 2,4,6-tribromophenol, phenol-*d*₆, and 2-fluorophenol are considered here.

No data are qualified as a result of surrogate recovery data.

The surrogate recoveries for all samples are presented in Table 3-8.

Table 3-8. Method 8270 Surrogate Compound Recoveries

Lab Sample Number	Field ID	2,4,6-Tribromophenol		2-Fluorophenol		Phenol- <i>d</i> ₆	
		Limits:	38	130	24	130	13
4070486001	111212001	92		54		37	
4070486002	111212002	87		45		30	
4070486003	111212003	101		52		35	
4070486004	111212004	95		52		38	
4070486005	111212005	99		47		35	
4070486006	111212006	102		53		40	
4070486007	111212007	112		57		39	
4070486008	111212008	103		54		37	
4070486009	111212009	112		55		38	
4070563001	111312001	112		57		40	
4070563002	111312002	104		61		41	
4070563003	111312003	90		44		32	
4070563004	111312004	94		54		39	
4070563005	111312005	96		55		38	

4070563006	111312006	110	67	47
4070563007	111312007	108	63	42
4070563008	111312008	107	65	44
4070563009	111312009	102	62	42
4070563010	111312010	98	57	39
4070563011	111312011	100	52	33
4070654001	111412001	88	56	35
4070654002	111412002	98	45	29

3.2.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on one sample.

All of the target analytes for all of the MS/MSD analyses samples recovered within the limits used by the laboratory. Further, all of the calculated RPD values were within acceptance limits.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*. Based upon the acceptable recoveries and good agreement for the field duplicates (see below), there is no need to qualify data based upon the MS/MSD recoveries.

The matrix spike/matrix spike duplicate results are summarized in Table 3-9.

Table 3-9. Method 8270 MS/MSD Recoveries

Analyte	MS Sample ID: 111312001			MSD Sample ID: 111312001			RPD	Lab Sample Result (µg/L)	Max RPD
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)			
2,4-Dimethylphenol	47.2	45.0	95	47.2	50.8	108	12	1.1 U	27
2-Methylphenol (<i>o</i> -Cresol)	47.2	38.8	82	47.2	41.5	88	6	0.95 U	212
3&4-Methylphenol (<i>m</i> & <i>p</i> -Cresol)	47.2	36.5	77	47.2	38.4	81	5	0.75 U	20
Phenol	47.2	20.9	44	47.2	22.5	48	7	1.0 U	22

3.2.6 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. All of the target analytes for all of the laboratory control samples recovered within the limits used by the laboratory. Based upon the acceptable recoveries, there is no need to qualify data based upon the LCS recovery results.

The laboratory control sample results are given in Table 3-10.

Table 3-10. Method 8270 Laboratory Control Sample Recoveries

Analyte	Recovery Limits (%)		QC Batch: 115911			QC Batch: 116342		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2,4-Dimethylphenol	17	130	50	48.7	97	50	31.7	63
2-Methylphenol(<i>o</i> -Cresol)	36	130	50	39.9	80	50	35.8	72
3&4-Methylphenol(<i>m</i> & <i>p</i> -Cresol)	34	130	50	36.5	73	50	33.7	67
Phenol	26	130	50	22.8	46	50	24.0	48

3.2.7 Field Duplicates

Field duplicates generally show excellent agreement for all of the analytes. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate “NDs”, however, are reported with 0% RPDs.

Based upon these observations, no results for any field samples associated with these duplicate pairs are qualified based upon field duplicate data.

The results of the field duplicate analyses are given in Table 3-11.

Table 3-11. Method 8270 Field Duplicates

Analyte	Sample ID: 111212001		Sample ID: 111212002		RPD	Sample ID: 111312005		Sample ID: 111312006		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
2,4-Dimethylphenol	1.1	U	1.1	U	0.0	1.2	U	1.2	U	0.0
2-Methylphenol(<i>o</i> -Cresol)	0.92	U	0.94	U	0.0	1.0	U	1.1	U	0.0
3&4-Methylphenol(<i>m</i> & <i>p</i> -Cresol)	0.72	U	0.74	U	0.0	0.83	U	0.83	U	0.0
Phenol	0.98	U	0.99	U	0.0	1.1	U	1.1	U	0.0

3.3 SW-846 Method 8270C/SIM –PAHs

3.3.1 Summary

SW-846 Method 8270C/SIM employs gas chromatographic separation with mass spectroscopic identification using selected ion monitoring (SIM).

3.3.2 Method Blanks, Equipment Blanks, Field Blanks

The samples were prepared in two different preparation batches. Naphthalene, and 2-methylnaphthalene were detected in one of the method blanks associated with these sample analyses. In both cases, the measured values were above the detection limit but below the reporting limit. Therefore, any positive values between the detection limit and the reporting limit

for these analytes for samples in the associated preparation batches will be qualified as not detected at the reporting limit. No other data are qualified due to the blank contamination.

The results for the method blanks are summarized in Table 3-12.

Table 3-12. Method 8270/SIM Method Blank Results Summary

Analyte	Units	QC Batch: 115780	QC Batch: 116064
2-Methylnaphthalene	µg/L	0.016J	0.0041 U
Acenaphthene	µg/L	0.0048 U	0.0048 U
Acenaphthylene	µg/L	0.0038 U	0.0038 U
Anthracene	µg/L	0.0061 U	0.0061 U
Benzo(a)anthracene	µg/L	0.0038 U	0.0038 U
Benzo(a)pyrene	µg/L	0.0030 U	0.0030 U
Benzo(b)fluoranthene	µg/L	0.0036 U	0.0036 U
Benzo(g,h,i)perylene	µg/L	0.0051 U	0.0051 U
Benzo(k)fluoranthene	µg/L	0.0046 U	0.0046 U
Chrysene	µg/L	0.0037 U	0.0037 U
Dibenz(a,h)anthracene	µg/L	0.0034 U	0.0034 U
Fluoranthene	µg/L	0.0047 U	0.0047 U
Fluorene	µg/L	0.0051 U	0.0051 U
Indeno(1,2,3-cd)pyrene	µg/L	0.0050 U	0.0050 U
Naphthalene	µg/L	0.029 J	0.0051 U
Phenanthrene	µg/L	0.0086 U	0.0086 U
Pyrene	µg/L	0.0050 U	0.0050 U

3.3.3 Calibration

Instrument tuning checks using decafluorotriphenylphosphine (DFTPP) were performed daily and every 12 hours as described in the methods. However, since this method employs selected ion monitoring, tuning using DFTPP has little value. Consequently, no data are qualified based upon DFTPP tuning criteria.

The initial instrument calibration performed for this method gave satisfactory results with response factors over the calibration range <15% RSD. Therefore an average response factor calibration model was used to quantitate all compounds results.

The initial calibration verifications (ICV) reported with this data set gave percent differences less than the 25% limit defined in the National Functional Guidelines for calibration verification. Therefore, no results are qualified as a consequence of the initial calibration verifications.

All of the continuing calibration verification (CCV) checks for PAH analyses performed gave acceptable results (i.e., <25% D using the CLP National Functional Guidelines) for all of the target analytes. No data are qualified as a consequence of the continuing calibration data.

The peak shapes and chromatographic resolution for the isomers benzo(b)fluoranthene and benzo(k)fluoranthene evident in the sample chromatograms for the samples indicate that the two isomers are not adequately resolved to be quantitated separately as the laboratory attempted to do. The laboratory’s report narratives noted this issue but stopped short of reporting the two isomers as a coeluting pair (as is done for *m/p*-xylene). Consequently all positive results for benzo(b)fluoranthene and benzo(k)fluoranthene in all samples for these two isomers are qualified as estimated (“J”).

3.3.4 Internal Standard Areas

None of the sample analyses reported in this data set gave internal standard areas greater than 200% or less than 50% of the area response of the corresponding continuing calibration verification. Therefore, no data are qualified due to failed internal standard responses.

3.3.5 Surrogate Compound Recoveries

Two surrogates, 2-fluorobiphenyl and terphenyl-*d*₁₄, were spiked into each field sample to monitor method recovery. Given the focused nature of the compounds of concern (i.e., PAHs), the surrogates reported should be adequate to monitor recovery in the analyses. No results a qualified based on surrogate recoveries.

The surrogate recoveries for all samples are presented in Table 3-13.

Table 3-13. Method 8270/SIM Surrogate Compound Recoveries

Lab Sample Number	Field ID	2-Fluorobiphenyl		Terphenyl- <i>d</i> ₁₄	
	Limits:	31	130	10	173
4070486001	111212001	54		94	
4070486002	111212002	53		90	
4070486003	111212003	56		84	
4070486004	111212004	54		95	
4070486005	111212005	52		86	
4070486006	111212006	52		89	
4070486007	111212007	63		98	
4070486008	111212008	66		94	
4070486009	111212009	48		67	
4070563001	111312001	55		90	
4070563002	111312002	51		87	
4070563003	111312003	57		92	
4070563004	111312004	56		96	

Lab Sample Number	Field ID	2-Fluorobiphenyl		Terphenyl- <i>d</i> ₁₄	
		Limits:	31	130	10
4070563005	111312005	58		96	
4070563006	111312006	52		91	
4070563007	111312007	59		99	
4070563008	111312008	62		103	
4070563009	111312009	57		95	
4070563010	111312010	49		86	
4070563011	111312011	43		82	
4070654001	111412001	45		87	
4070654002	111412002	49		90	

3.3.6 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on one sample.

One of the samples gave a failing RPD value for one of the analytes.

The National Functional Guidelines do not call for qualifying data on the basis of matrix spike data *alone*, except for those samples where more than half of the analytes failed to recover within limits. No data are qualified as a result of the MS/MSD recoveries, as sample data are more definitively qualified based upon the LCS data.

The matrix spike/matrix spike duplicate results are summarized in Table 3-14.

Table 3-14. Method 8270/SIM MS/MSD Recoveries

Analyte	MS Sample ID: 111312001			MSD Sample ID: 111312001			RPD	Lab Sample Result (µg/L)	Max RPD
	Spike (µg/L)	MS Result (µg/L)	Recovery (%)	Spike (µg/L)	MSD Result (µg/L)	Recovery (%)			
2-Methylnaphthalene	.19	0.093	47	.19	0.11	54	13	0.0042 JB	37
Acenaphthene	.19	0.098	49	.19	0.11	55	12	0.0069 J	34
Acenaphthylene	.19	0.090	47	.19	0.099	52	10	0.0036 U	32
Anthracene	.19	0.064	31	.19	0.1	51	45	0.0057 U	39
Benzo(a)anthracene	.19	0.16	83	.19	0.14	69	18	0.0066 J	21
Benzo(a)pyrene	.19	0.14	69	.19	0.12	60	14	0.0061 J	24
Benzo(b)fluoranthene	.19	0.15	76	.19	0.12	61	21	0.0090 J	32
Benzo(g,h,i)perylene	.19	0.16	80	.19	0.14	70	13	0.0066 J	25
Benzo(k)fluoranthene	.19	0.16	79	.19	0.17	86	9	0.0079 J	26
Chrysene	.19	0.19	91	.19	0.17	81	10	0.014 J	21
Dibenz(a,h)anthracene	.19	0.14	73	.19	0.12	64	12	0.0032 U	22
Fluoranthene	.19	0.20	90	.19	0.18	78	12	0.034 J	31
Fluorene	.19	0.092	46	.19	0.11	55	16	0.0048 J	37
Indeno(1,2,3-cd)pyrene	.19	0.15	78	.19	0.13	68	13	0.0047 U	25
Naphthalene	.19	0.090	43	.19	0.097	46	7	0.010 JB	41
Phenanthrene	.19	0.13	59	.19	0.16	71	14	0.023 J	32
Pyrene	.19	0.19	87	.19	0.17	73	15	0.028 J	33

3.3.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed with each batch of samples. All of the analytes for the laboratory control samples recovered within the limits used by the laboratory. No results are qualified as a result of laboratory control samples.

The laboratory control sample results are given in Table 3-15.

Table 3-15. Method 8270/SIM Laboratory Control Sample Recoveries

Analyte	Recovery Limits (%)		QC Batch: 115780			QC Batch: 116064		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)	Spike (µg/L)	Result (µg/L)	Recovery (%)
2-Methylnaphthalene	29	130	.2	0.14	72	.2	0.13	63
Acenaphthene	30	130	.2	0.14	70	.2	0.12	58
Acenaphthylene	23	130	.2	0.13	67	.2	0.11	57
Anthracene	20	130	.2	0.13	65	.2	0.087	44
Benzo(a)anthracene	34	130	.2	0.12	62	.2	0.15	77
Benzo(a)pyrene	41	130	.2	0.15	74	.2	0.13	65
Benzo(b)fluoranthene	31	131	.2	0.15	74	.2	0.16	79
Benzo(g,h,i)perylene	51	130	.2	0.16	79	.2	0.17	86
Benzo(k)fluoranthene	56	130	.2	0.18	90	.2	0.18	91
Chrysene	55	130	.2	0.19	94	.2	0.16	79
Dibenz(a,h)anthracene	40	130	.2	0.15	75	.2	0.18	88
Fluoranthene	38	130	.2	0.17	83	.2	0.14	71
Fluorene	27	130	.2	0.14	69	.2	0.12	60
Indeno(1,2,3-cd)pyrene	48	130	.2	0.16	78	.2	0.17	87
Naphthalene	33	130	.2	0.14	70	.2	0.12	61
Phenanthrene	28	130	.2	0.14	72	.2	0.13	67
Pyrene	41	130	.2	0.15	76	.2	0.14	69

3.3.8 Field Duplicates

Field duplicates generally show good agreement for all of the analytes. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate “NDs”, however, are reported with 0% RPDs.

One of the field duplicate pairs gave RPD values for many analytes greater than the 30% RPD limit published in the Multi-Site QAPP Addendum. However, all of the values exceeding the 30% limit were instances where one or both results were below the reporting limit. In these instances, qualifying the data based upon values below the reporting limit is not necessary even though the Multi-Site QAPP Addendum does not explicitly make that distinction.

The results of the duplicate analyses are given in Tables 3-16.

Table 3-16. Method 8270/SIM Field Duplicates

Analyte	Sample ID: 111212001		Sample ID: 111212002		RPD	Sample ID: 111312005		Sample ID: 111312006		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag		Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
2-Methylnaphthalene	0.0040	U	0.0039	U	0.0	0.0047	U	0.0042	U	0.0
Acenaphthene	0.0067	J	0.0067	J	0.0	0.011	J	0.0057	J	63.5
Acenaphthylene	0.0037	U	0.0037	U	0.0	0.0044	U	0.0039	U	0.0
Anthracene	0.0068	J	0.0062	J	9.2	0.013	J	0.010	J	26.1
Benzo(a)anthracene	0.020	J	0.016	J	22.2	0.015	J	0.012	J	22.2
Benzo(a)pyrene	0.021	J	0.019	J	10.0	0.016	J	0.0088	J	58.1
Benzo(b)fluoranthene	0.026	J	0.024	J	8.0	0.016	J	0.011	J	37.0
Benzo(g,h,i)perylene	0.022	J	0.019	J	14.6	0.015	J	0.0096	J	43.9
Benzo(k)fluoranthene	0.023	J	0.019	J	19.0	0.018	J	0.011	J	48.3
Chrysene	0.034	J	0.030	J	12.5	0.031	J	0.018	J	53.1
Dibenz(a,h)anthracene	0.0046	J	0.0033	U	NC	0.0039	U	0.0035	U	0.0
Fluoranthene	0.063		0.058		8.3	0.070		0.047	J	39.3
Fluorene	0.0050	U	0.0049	U	0.0	0.013	J	0.0074	J	54.9
Indeno(1,2,3-cd)pyrene	0.015	J	0.013	J	14.3	0.0095	J	0.0068	J	33.1
Naphthalene	0.0053	JB	0.0055	JB	3.7	0.010	JB	0.0052	U	NC
Phenanthrene	0.026	J	0.024	J	8.0	0.051	J	0.023	J	75.7
Pyrene	0.050		0.052		3.9	0.059		0.039	J	40.8

3.4 SW-846 Method 8082A, Polychlorinated Biphenyls (PCBs)

3.4.1 Summary

Samples were analyzed for polychlorinated biphenyls (PCBs) using SW-846 Method 8082A. Method 8082A employs gas chromatographic separation with a halogen specific electron capture detector. Identification is accomplished by comparing retention times and elution patterns to known standards and confirmed by analysis on a second gas chromatographic column of dissimilar phase.

Overall, analytical batch QC data indicated acceptable precision and accuracy.

The results of the QC review are presented below. One method blank was prepared and analyzed with each analytical batch of samples.

3.4.2 Sample Receipt

All samples were received by the laboratory in good condition, cold (4°C ± 2°C) and intact. All samples were prepared and analyzed within the prescribed holding times.

3.4.3 Method Blanks

A laboratory method blank was prepared and analyzed for each analytical batch. The method blank consisted of an aliquot of sodium sulfate extracted as a sample. None of the PCBs were detected above the detection limit in the method blanks. Therefore, none of the data were flagged, and no data were adjusted as a result of blank contamination.

The method blank results are summarized in Table 3-17.

Table 3-17. Method 8082 Method Blank Results Summary

Analyte	Units	QC Batch: 115861
PCB-1016 (Aroclor 1016)	µg/L	0.15 U
PCB-1221 (Aroclor 1221)	µg/L	0.15 U
PCB-1232 (Aroclor 1232)	µg/L	0.15 U
PCB-1242 (Aroclor 1242)	µg/L	0.15 U
PCB-1248 (Aroclor 1248)	µg/L	0.15 U
PCB-1254 (Aroclor 1254)	µg/L	0.15 U
PCB-1260 (Aroclor 1260)	µg/L	0.15 U

3.4.4 Calibration

All initial calibration acceptance criteria were met for all of the analytes. Multi-point calibration curves were developed using Aroclors 1016, 1242, 1248, 1254, and 1260. The remaining Aroclor mixtures were calibrated using a single point calibration standard.

Multiple calibration verifications (CCVs) were performed in the course of these analyses. As evident from the run logs provided in the raw data packages, the laboratory routinely analyzes two successive CCV standards as part of their analytical protocol in an automated mode. The practice also appears to be to ignore the second CCV if the first one passes (as indicated by the handwritten “NA” notations) and to accept the data if the first one fails and the second one passes. While there is no specific prohibition against such practice, the reference methods and the standards for accreditation generally require some sort of corrective action between failing calibration checks. Further, other programs (e.g., the Department of Defense Environmental Laboratory Accreditation Program) specifically require that in such cases both CCVs must be evaluated and both must pass, otherwise the instrument is deemed to be out of control. Also, the NFG do not address such circumstances. Accordingly, any failing CCV, regardless of an immediately following acceptable CCV, should be cause for qualifying data. Since none of the CCV results were failing no results are qualified based on calibration.

3.4.5 Surrogate Compound Recoveries

Two surrogates, tetrachloro-*m*-xylene (TCMX) and decachlorobiphenyl (DCB), were spiked into each field sample to monitor method recovery. Use of these two compounds as surrogates is consistent with the SW-846 guidance.

No data are qualified due to surrogate compound recovery.

The surrogate recoveries for all sample analyses are presented in Table 3-18.

Table 3-18. Method 8082 Surrogate Compound Recoveries

Lab Sample Number	Field ID	Decachlorobiphenyl		Tetrachloro- <i>m</i> -xylene	
	Limits:	31	130	10	173
4070486001	111212001	86		91	
4070486002	111212002	85		88	
4070486004	111212004	71		76	
4070486006	111212006	76		80	
4070486008	111212008	90		82	
4070563001	111312001	73		79	
4070563002	111312002	62		83	
4070563003	111312003	79		78	
4070563004	111312004	75		83	

3.4.6 Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spiked duplicate (MS/MSD) analyses were performed on one of the samples. All of the recoveries fell within the limits used by the laboratory. No data are qualified based upon the MS/MSD results.

The MS/MSD recoveries for all sample analyses are presented in Table 3-19.

Table 3-19. Method 8082 MS/MSD Recoveries

Analyte	Spike (µg/L)	MS Sample ID: 111312001		MSD Sample ID: 111312001		RPD	Lab Sample Result (µg/L)	Max RPD
		MS Result (µg/L)	Recovery (%)	MSD Result (µg/L)	Recovery (%)			
PCB-1260 (Aroclor 1260)	4.7	4.5	95	4.3	90	5	0.30 U	29

3.4.7 Laboratory Control Samples

A laboratory control sample (LCS) was prepared and analyzed for each analytical batch. None of the recoveries exceeded the laboratory's control limits for PCB -1260, hence there is no need for any further qualification of the data.

The laboratory control sample results are presented in Table 3-20.

Table 3-20. Method 8082 Laboratory Control Sample Recoveries

Analyte	Recovery Limits (%)		QC Batch: 115861		
	Lower	Upper	Spike (µg/L)	Result (µg/L)	Recovery (%)
PCB-1260 (Aroclor 1260)	51	142	2.5	2.7	108

3.4.8 Field Duplicates

One field duplicate pair was analyzed for this set of samples. Precision is only calculated where both the sample and the duplicate sample gave a positive result (NC=Not Calculated). Duplicate "NDs", however, are reported with 0% RPDs. No data are qualified based on the field duplicate results.

The results of the duplicate analyses are given in Table 3-21.

Table 3-21. Method 8082 Field Duplicates

Analyte	Sample ID: 111212001		Sample ID: 111212002		RPD
	Result (µg/L)	Lab Flag	Result (µg/L)	Lab Flag	
PCB, Total	0.29	U	0.29	U	0.0
PCB-1016 (Aroclor 1016)	0.29	U	0.29	U	0.0
PCB-1221 (Aroclor 1221)	0.29	U	0.29	U	0.0
PCB-1232 (Aroclor 1232)	0.29	U	0.29	U	0.0
PCB-1242 (Aroclor 1242)	0.29	U	0.29	U	0.0
PCB-1248 (Aroclor 1248)	0.29	U	0.29	U	0.0
PCB-1254 (Aroclor 1254)	0.29	U	0.29	U	0.0
PCB-1260 (Aroclor 1260)	0.29	U	0.29	U	0.0